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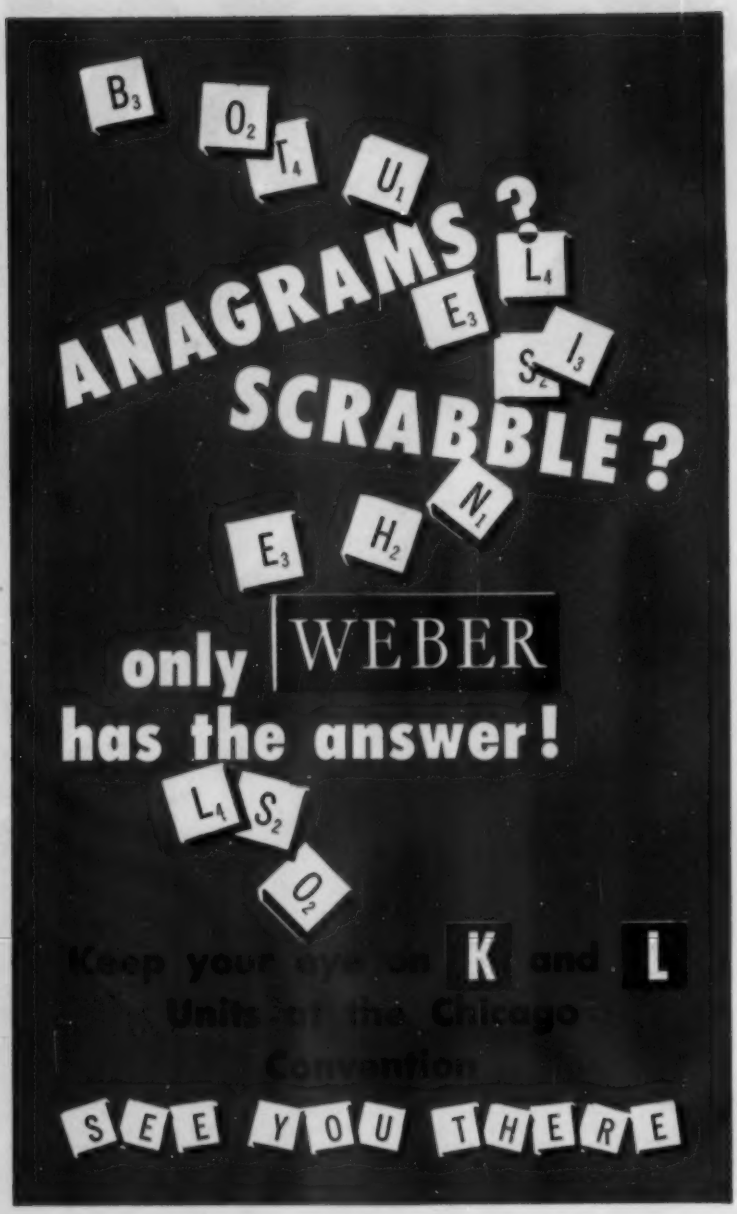
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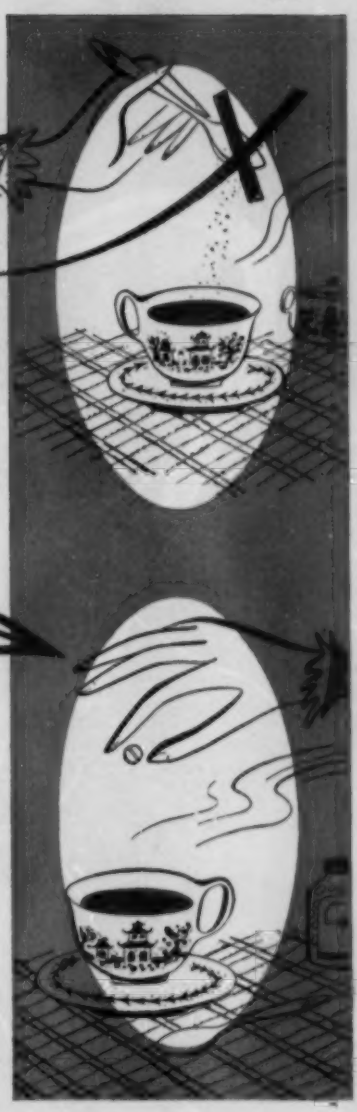

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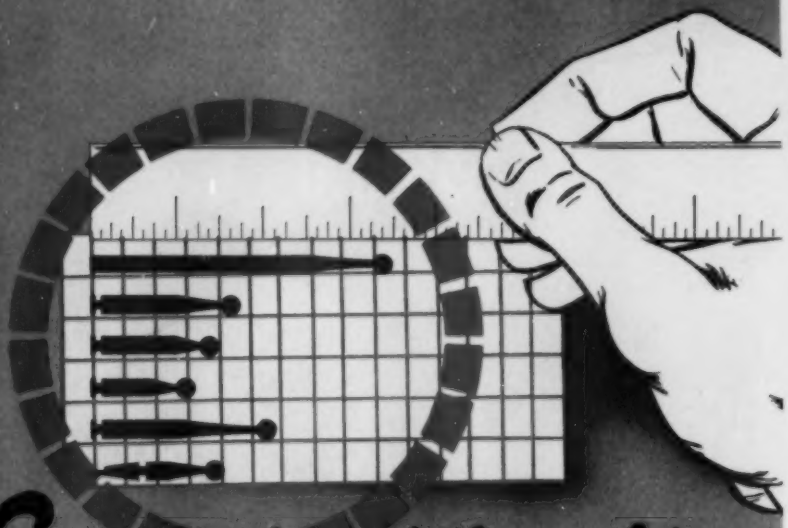

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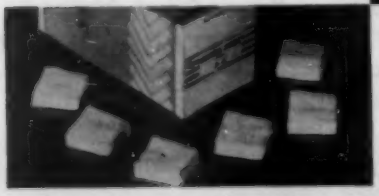

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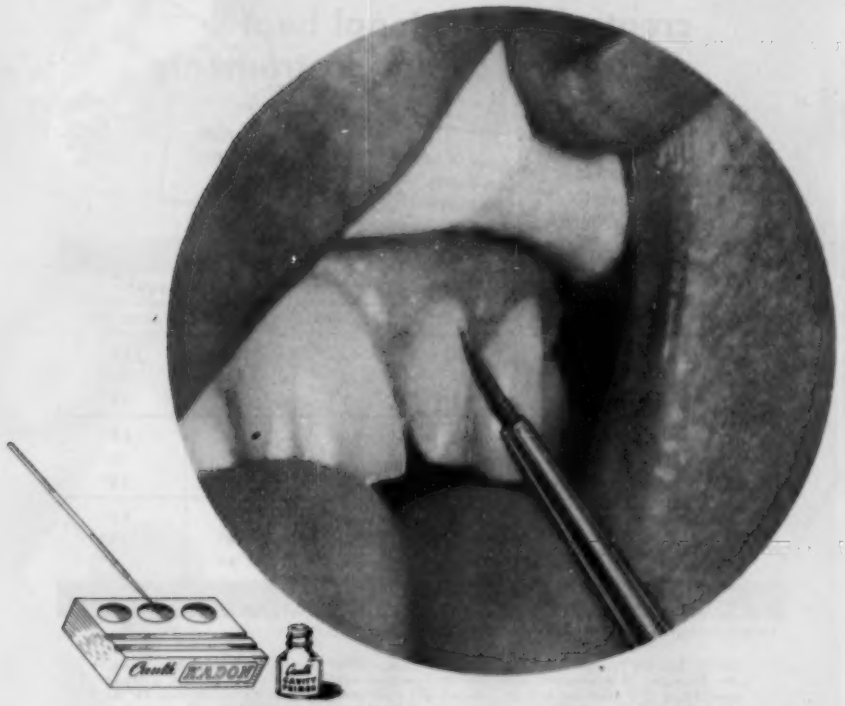

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TYPE BUR	COOLANT	DEGREES F. RISE AT 1 LB. PRESSURE			
		2000 RPM	4000 RPM	6000 RPM	10000 RPM
#37 Steel	None	37°	60°	78°	112°
	Air Only	17°	25°	33°	43°
	Air-Water Spray	4°	7°	9°	12°
#37 Tungsten Carbide	None	26°	42°	57°	84°
	Air Only	17°	25°	33°	45°
	Air-Water Spray	3°	6°	9°	12°
#701 Diamond	None	21°	30°	39°	52°
	Air Only	9°	14°	18°	25°
	Air-Water Spray	2°	4°	7°	9°

* Report Published in New York Journal of Dentistry, 22:147-157 (April) 1952

NOTE: Degrees F. represent temperature rise above initial temperature of operating area. For example, at intermittent operation of 2 seconds cutting and 1 second rest, *without coolant*, a #37 steel bur at 1 lb. pressure and 6000 rpm increases the temperature 78° F. Accepting 90° F. as the initial temperature of the operating area, the cutting operation, therefore, brings the temperature in the tooth structure up to 168° F.

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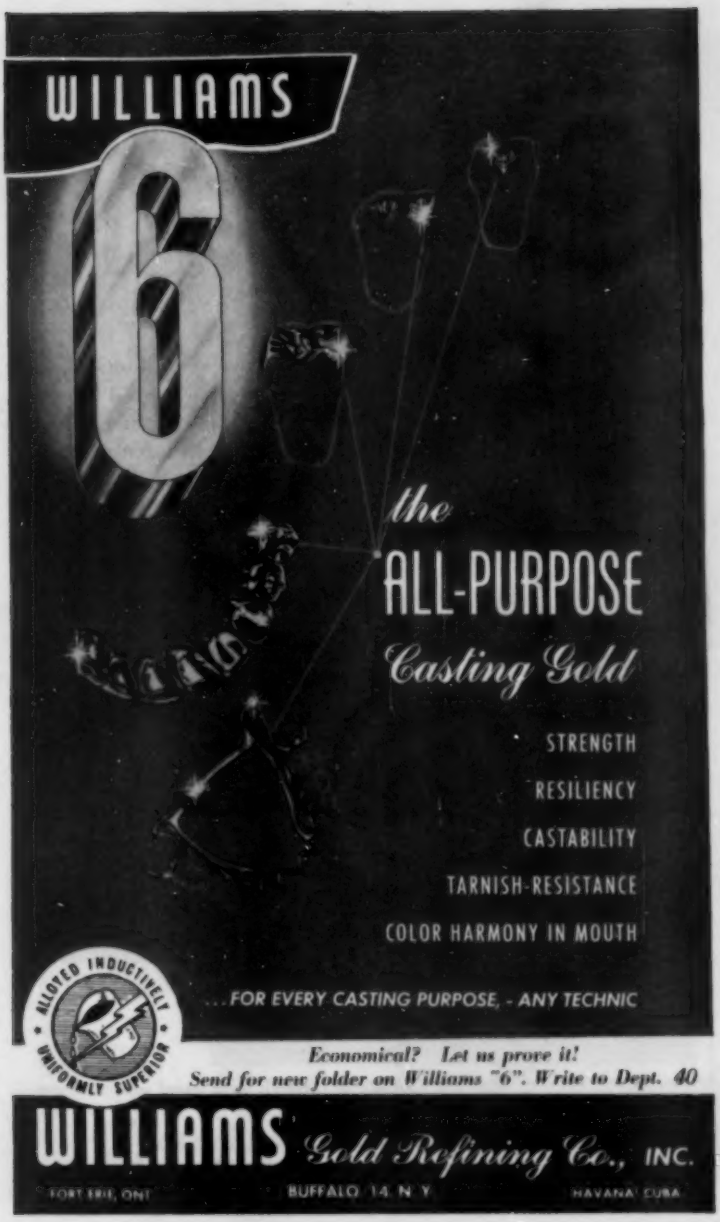
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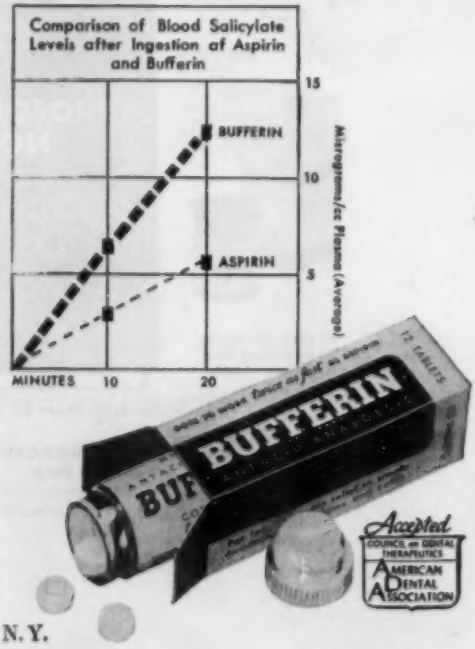

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Temperatures developed in rotating dental cutting instruments

Donald C. Hudson, D.D.S., and W. T. Sweeney,† A. B., Washington, D. C.*

An Air Force survey conducted in 1946 by some 200 dental officers revealed that a large number of flying personnel were afflicted with dental pain when subjected to low atmospheric pressures.[1] This pain was of such severity that it interfered with their performance of duty as members of an air crew. Most of these painful conditions were found to occur in recently filled teeth; and it was suspected that the trauma of cutting and of heating of tooth structure, which occur during cavity preparation, was responsible for the ill effects.

At that time a project was started at the School of Aviation Medicine at Randolph Field, Texas, to determine some of the factors causing heat trauma to dental pulps during the preparation of cavities with rotating cutting instruments. This project was transferred to the National Bureau of Standards in 1950 under a grant from the School of Aviation Medicine.

The dental literature on the subjects of heat production, cutting efficiency of burs, traumatic effects of cavity preparation and pulp reactions to heat was reviewed. An analysis of the work by Jeserich,[2] Bodecker,[3] Walsh and Symmons,[4] Henschel,[5-7] Anderson and Van Praagh,[8] Lisanti and Zander,[9] and Pey-

*Colonel, Dental Service, U. S. Air Force. Stationed at the National Bureau of Standards.

†Chief, Dental Research Section, National Bureau of Standards.

1. Preliminary report. School of Aviation Medicine, Dec. 31, 1949.

2. Jeserich, Paul H. Factors necessary to minimize thermal changes in tooth structures from operative procedures. New York J. Den. 5:275 Dec. 1935.

3. Bodecker, C. F. Demonstration of possible ill effects of heat on the pulp caused by rapid operative technic. J.A.D.A. 26:527 April 1939.

4. Walsh, J. F., and Symmons, H. F. Comparison of the heat production and mechanical efficiency of diamond instruments, stones and burs at 3,000 and 60,000 R.P.M. New Zealand D. J. 45:28 Jan. 1949.

5. Henschel, C. J. Development of thermal control. J.A.D.A. 33:194 Feb. 1946.

6. Henschel, C. J. Heat impact of revolving instruments on vital dentin tubules. J. D. Res. 22:323 Aug. 1943.

7. Henschel, C. J. The friction of revolving steel burs. J.A.D.A. 31:895 July 1944.

ton and Vaughn[10] led to several conclusions which formed the basis for the study carried out at the National Bureau of Standards. These conclusions were: (1) Physiological changes occur in normal dentin at temperatures above 130° F.[8] (2) Application of heated instruments, in the range from 125°F. to 600° F., to the floor of cavity preparations in dogs' teeth for varying lengths of time caused definite alterations in the odontoblastic layer, blister formation and inflammatory changes.[9] (3) At a constant load, heat production by revolving burs increases with increase in speed of rotation.[10] (4) Cutting rate increases with increase in speed and pressure.[10]

Some previous workers used indirect methods, such as calorimetric determinations of heat production during burring, to determine bur temperature.[7] Others measured temperatures by means of thermocouples inserted in teeth at points near the section being cut by the revolving bur.[10] Estimates of bur temperature were based also on such factors as changes observed in color of the steel and the melting of tin-lead alloys when cut by dental burs.[7]

A more direct approach to the problem of determining bur temperature was attempted in the study reported here. Efforts were directed toward the measurement of the temperature of the head of the bur during cutting operations.

APPARATUS AND METHODS

A machine with accessory timing and controlling features which had been constructed at the School of Aviation Medicine and which was designed to rotate dental burs at speeds up to 25,000 rpm had been shipped to the National Bureau of Standards at the time of the transfer of the project. This machine was modified so that the following conditions could be established: (1) speed of rotation up to 25,000 ± 200 rpm, (2) a depth of cut of 0.15 ± 0.001 inch, (3) a cutting load up to 600 ± 1 Gm. Provision for recording time to the nearest 1/1000 minute was included in the apparatus, as was also control of the starting and stopping of the cutting cycle by means of electromagnetic devices. All burring was done with 2.35 mm. no. 8 eight-bladed round burs cutting axially, mounted in a vertical precision chuck. Specimens to be cut were lowered from above and were weighted to exert the desired pressure on the bur (Fig. 1, left).

A constantan wire no. 36, 0.005 inch in diameter, was soft-soldered in a groove between two blades of each test bur (Fig. 1, right). With the aid of a binocular microscope, the excess solder was cut away with a fine instrument to prevent its interference with the operation of the bur. The wire was secured to the bur shank with an insulating adhesive extending to the slip ring commutator to which it was connected (Fig. 2, above). The circuit was completed through the bur itself and another commutator ring at the base of the chuck. The commutator and brushes were of brass. The reference junction of the thermocouple was effectively located at the recording instrument, a Brown Instrument recording potentiometer. The latter provided automatic compensation for variations of reference junction temperature. The bur-constantan thermocouple was calibrated relative to an iron-constantan thermocouple in a liquid bath, and a curve was obtained which was used to correct the readings of the recording potentiometer.

RESULTS

Human tooth enamel and dentin were cut first with the tooth held by hand and

8. Anderson, D. J., and Van Praagh, G. Preliminary investigation of the temperatures produced in burring. Brit. D. J. 73:62 Aug. 1, 1942.

9. Lisanti, V. F., and Zander, H. A. Thermal injury to normal dog teeth: in vivo measurements of pulp temperature increases and their effect on the pulp tissues. J. D. Res. 31:549 Aug. 1952.

10. Peyton, F. A., and Vaughn, R. C. Thermal changes developed during the cutting of tooth tissue. Fort. Rev. Chicago D. Soc. 20:9 Dec. 15, 1950.

with sufficient force exerted to achieve the cutting usual in operating. When dentin alone was cut, the temperatures recorded varied from 150°F. at 2,000 rpm to 275°F. at 7,500 rpm. When the bur was moved laterally to cut both enamel and dentin as is done in the extension of a cavity preparation, temperatures as high as 350°F. were observed.

An effort was made to penetrate the occlusal enamel of a molar tooth at 7,500 rpm. The bur was engaged in a noncarious occlusal pit, and force such as would be exerted in ordinary operating was applied. Cutting was slight, and the temperature of the bur mounted rapidly, reaching over 600°F. Examination of the bur revealed dulling of the edges of the blades (Fig. 2, below, A), and pronounced color changes were noted. Blue colors which developed at the blade edges corresponded to those indicated for steel temper colors at temperatures near 600°F.[11]

Results could not be reproduced satisfactorily with natural tooth substance because of wide variation in properties from tooth to tooth. Therefore, it was decided that a synthetic substance, which was to be cut by the bur at approximately the same rate as dentin, would be used for all temperature and cutting rate measurements. The material chosen was a cast, filled Bakelite resin (BT-44-992), from which conveniently sized specimens were prepared.

11. Young, C. S. F. Coloring steel. Metals handbook, 1948 edition, p. 730.

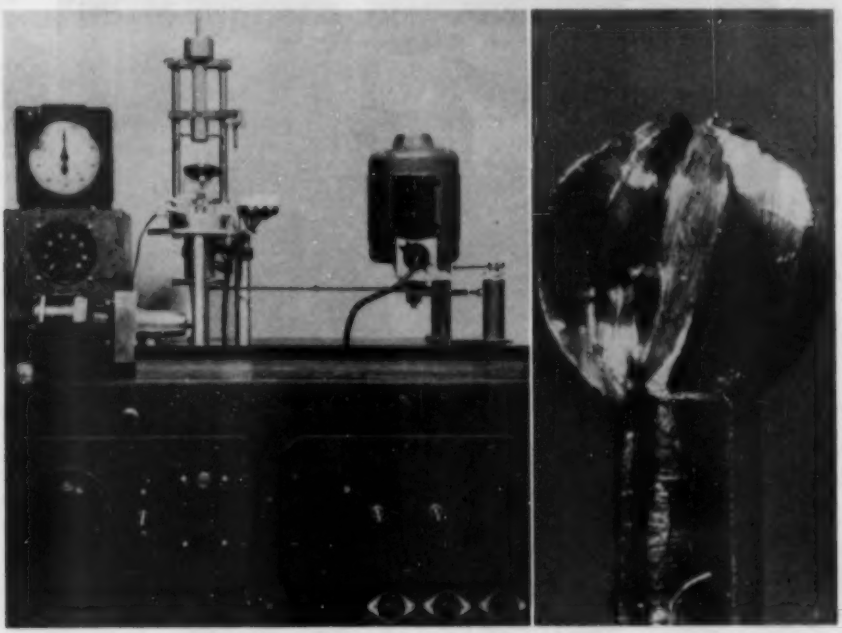

Fig. 1 • Left: Bur-evaluating machine; vertical spindle, with chuck, driven by variable speed motor; accessory timing and limiting controls. Right: Thermocouple wire soldered in groove between bur blades

The curve shown in Figure 3 is plotted from data obtained in a series of ten test runs in this material at a load of 200 Gm. and at each of several speeds from 2,000 to 24,000 rpm (table). All cuts in each run were made to a depth of 0.15 inch. The final bur temperature, after a test run to this depth, increased rapidly with rotational speed up to about 6,000 rpm with only slight variations as the speed was further increased. The tolerances appearing in the table indicate probable error of an individual reading, and were derived from the ten readings in each case by means of the formula

$$.6745\sqrt{\frac{\text{Sum}(x-\bar{x})^2}{10-1}}$$

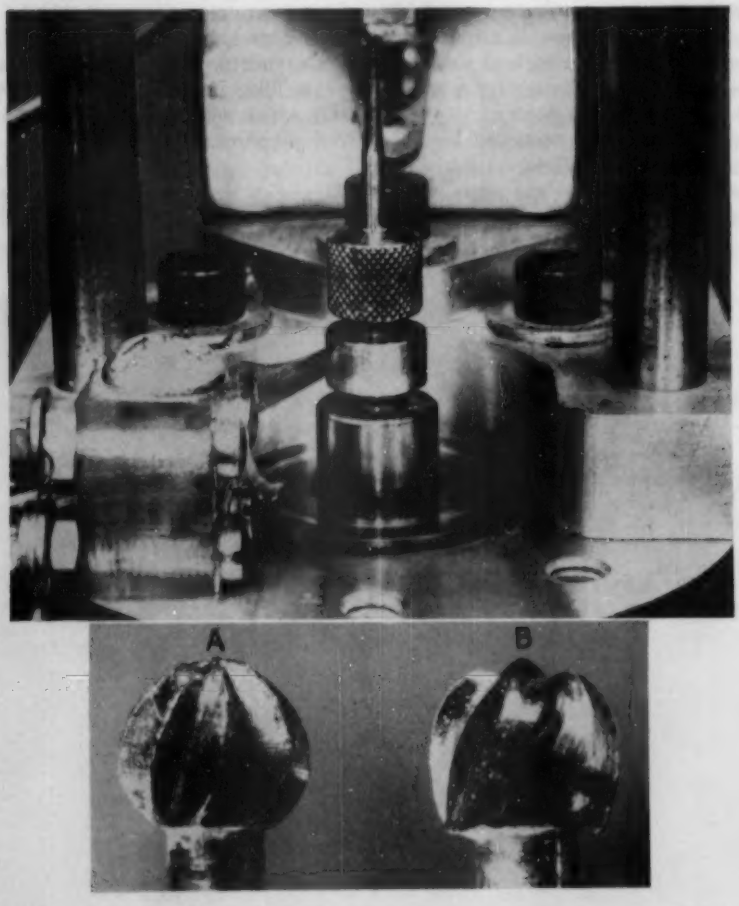

Fig. 2 • Above: Bur-holding chuck, showing commutator and brush assembly. Below: A, steel bur after an attempt to cut human tooth enamel at 7,500 rpm. Note turned edges of blades. B, carbide bur after cutting of enamel at 7,500 rpm. There is no apparent damage to bur

where x denotes an individual reading and $\bar{x}$ the average of all ten.

A series of five cuts was made at a load of 200 Gm., with the constantan wire soldered on the forward surface of a bur blade about midway between base and edge rather than in the groove between blades. It will be noted from the table and Figure 4 that the temperatures recorded at points on the blade were higher than those taken in the groove.

The time required to make a cut 0.15 inch deep, plotted against rotational speed, is shown in Figure 5. The data are shown in the table. It is interesting to note that the time falls rapidly as the rotational speed increases until the region 8,000 to 12,000 rpm is reached. Beyond this region the curve flattens, and the time required to complete the cut at 24,000 rpm is only about 3 seconds less than that required at 10,000 rpm, whereas the difference between the times required to make the cut at 2,000 and 12,000 rpm is as much as 24 seconds. These data indicate within the limits of experimental error that steel burs cut faster under constant load as speed of rotation increases; that is, within the range studied.

The reduction in cutting time achieved by extending the rotational speed above the conventional range is significant; the reduction can be accomplished up to 10,000 to 12,000 rpm with conventional dental engines and handpieces. Operating at a speed of 24,000 rpm with improved equipment can result in a cutting operation being performed in half the time that would be required at 12,000 rpm.

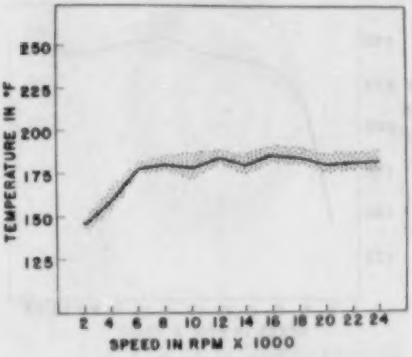

Fig. 3 • Temperature in groove between bur blades, plotted against speed of rotation. Force of 200 Gm. applied to no. 8 steel bur cutting dentin substitute. Shaded areas indicate limits of probable error

Bur temperatures are shown to remain substantially constant in the range 12,000 to 24,000 rpm (Fig. 3 and 4). There-

Table • Effect of rate of rotation on temperature rise and cutting rate of dental burs*

Speed of rotation	Steel burs			Carbide burs	
	Temperature		Time	Temperature	Time
	In groove	On blade		In groove	
rpm	°F.	°F.	sec.	°F.	sec.
2,000	145 ± 3	142 ± 3	28.7 ± 7.1	162 ± 4	28.6 ± 8.0
4,000	160 ± 8	212 ± 8	14.4 ± 4.0	175 ± 4	8.3 ± 1.0
6,000	178 ± 4	232 ± 11	8.1 ± 2.4	184 ± 2	6.8 ± 1.0
8,000	181 ± 4	237 ± 13	5.7 ± 1.4	192 ± 2	5.5 ± 1.0
10,000	179 ± 8	239 ± 18	4.3 ± 0.7	196 ± 4	4.6 ± 1.0
12,000	185 ± 4	243 ± 12	3.6 ± 0.2	198 ± 2	4.0 ± .0
14,000	179 ± 6	244 ± 16	2.9 ± 0.4	198 ± 3	3.0 ± .0
16,000	186 ± 5	248 ± 11	2.3 ± 0.2	198 ± 2	2.8 ± .2
18,000	185 ± 5	246 ± 12	2.1 ± 0.2	196 ± 2	2.3 ± .1
20,000	181 ± 6	242 ± 6	1.8 ± 0.2	194 ± 2	2.0 ± .1
22,000	182 ± 6	243 ± 8	1.7 ± 0.1		
24,000	182 ± 6	245 ± 9	1.7 ± 0.1		

*Synthetic dentin substitute (Bakelite cast resin BT-44-992) was cut with no. 8 round burs. Force of 200 Gm. was applied to burs cutting axially to depth of 0.15 ± 0.001 inch.

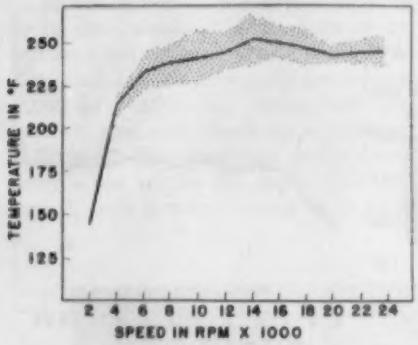

Fig. 4 • Temperature on slope of bur blade, plotted against speed of rotation. Force of 200 Gm. applied to no. 8 steel bur cutting dentin substitute. Shaded areas indicate limits of probable error

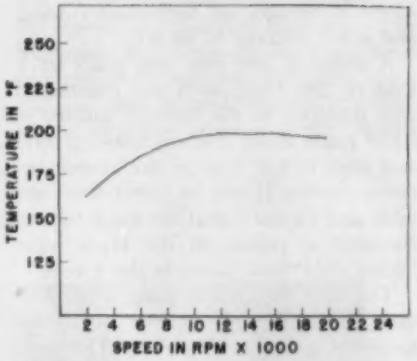

Fig. 6 • Temperature in groove between blades of no. 8 carbide bur, plotted against speed of rotation. Force of 200 Gm. applied in cutting of dentin substitute

fore, since heat trauma is dependent on both bur temperature and time of contact in cutting, any reduction in the time required to complete a cutting operation will reduce the possibility of damage to vital structures due to heat.

These experiments were repeated; instead of all-steel burs, steel-shanked, carbide-tipped burs of the same size and blade arrangement as those of the all-steel burs were used. A curve of temperature versus revolutions per minute, plotted from data in the table, is shown in Figure 6. The time required to reach a depth of 0.15 inch in cutting is given in the table, and the curve of time plotted against revolutions per minute is shown in Figure 7. It will be noted that the rate of cutting compares closely with that of the all-steel bur. The tolerances appearing in the table show the total spread in the five readings of time and temperature.

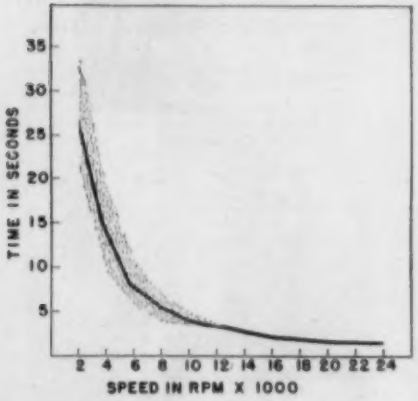

Fig. 5 • Time required to complete a cut of 0.15 inch, plotted against speed of rotation. Force of 200 Gm. applied to no. 8 steel bur cutting dentin substitute

Carbide-tipped burs penetrated tooth enamel easily without damage to the bur blades (Fig. 2, below, B).

Lisanti and Zander have shown that instruments heated to temperatures in the range 125°F. to 600°F. and applied to the pulpal floors of cavities in normal dogs' teeth produced definite pulpal reactions.[9] It would be reasonable to assume, therefore, that dental operative procedures performed with burs that reach temperatures of from 140°F. to 250°F. may be responsible for unfavorable reactions in the human tooth. Postoperative pain occurring at high altitudes in recently restored teeth of flying per-

sonnel may be due to volume changes—caused by variations in barometric pressure—in blisters or regions of separation of the odontoblastic layer from the pulpal wall. The use of a coolant would appear to be indicated, especially for operating at high speeds.

CONCLUSIONS

1. The temperatures reached by dental burs in cutting human dentin ranged from 150°F. to 275°F. Temperatures attained when a synthetic substitute for dentin was used ranged from 140°F. to 250°F., measured midway on the forward surface of the bur blade. Since these values are above those said to be tolerated by normal human dentin,[5] it would seem advisable to use some form of coolant in burring, especially at high speeds.

2. Under the conditions used in this investigation, steel and carbide burs cut more rapidly, since their speed of rotation increases at a constant load.

3. Steel burs are not suited to the cutting of tooth enamel because of their relative softness, whereas carbide burs cut enamel readily and without damage to the bur.

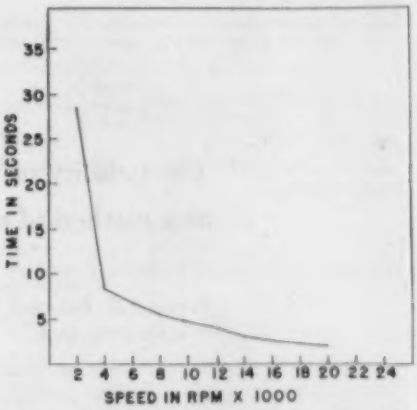

Fig. 7 • Time required to complete depth of cut to 0.15 inch, plotted against speed of rotation. Force of 200 Gm. applied to no. 8 carbide bur cutting dentin substitute

4. A significant decrease in the time required to accomplish a given operation is apparent when high operating speeds are used.

5. The amount of heat transferred to the tooth from the bur decreases at speeds above 12,000 rpm, since cutting time at these speeds is reduced and bur temperature remains substantially constant; and there is less heat trauma to vital structures.

Antiquity of Disease • Disease is more ancient than man. Evidence of disease has been found in dinosaurs and other forms of life which antedated man by millions of years. Then when man arrived on the scene, disease was waiting to meet him and constituted one of his earliest problems as soon as he became able to think at all. He observed that animals ate certain grasses and plants when they were ill and he proceeded to do the same. Then by trial and error he discovered that some plants were foods, others were drugs (such as purgatives), others poisons. His experiments dealt mainly with the vegetable world, and the majority of his remedies were derived from plants. All this was perfectly rational, and to this day we use some domestic medicines which our early ancestors discovered. Folk-medicine is probably the most ancient form of medicine. *D. Guthrie, Proceedings of the Royal Society of Medicine 45:92, 1952.*

The validity of plaque pH measurements as a method of evaluating therapeutic agents

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The development of therapeutic agents for the prevention of dental caries has been, and still is, the objective of many research workers. Clinical evaluation of such agents is made difficult by the size of the groups of subjects and by the extended time intervals required. Such clinical studies are further hampered by the uncertainties that exist in defining and evaluating carious lesions as discussed by Finn.[1] With these problems in mind, a number of screening tests of a simpler nature have been devised to facilitate the rapid examination of proposed "anti-caries" agents. It is obvious, however, that no laboratory procedure can replace actual clinical study as a basis for final conclusion, at least until the etiology of caries is more completely understood. Thus, it is necessary to determine the extent to which screening tests can be used reliably.

This paper reports the results of a study of plaque pH similar to the study originally described by Fosdick and coworkers.[2] In a recent study reported by Fosdick,[3] the same method was used as a screening test. The study reported herein is concerned only with acid formation *per se* and its measurement as a screening procedure, and not with the determination of any etiologic relationship between acid production and dental caries. Several aspects of this problem have been investigated, and among those to be described and discussed are the accuracy and precision of a single pH measurement as confirmed by several different technics, the variations in pH of different samples from the same mouth and the demonstration of acid formation after prolonged use of a dentifrice containing sodium N-lauroyl sarcosinate.

EXPERIMENTAL METHOD

Apparatus • Glass microelectrodes and a salt bridge were prepared according to the directions of Fosdick and co-workers.[2] These were used in conjunction with a Coleman Model 3D pH meter. The electrode was found to respond satisfactorily to a series of standard buffers ranging from pH 4 to 8. The electrodes were prepared to receive the plaque sample by first flushing the capillary of the salt bridge with saturated potassium chloride,

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1. Finn, S. B. Prevalence of dental caries. In Survey of the literature of dental caries, National Research Council, Washington, National Academy of Sciences, 1952, p. 119.

2. Fosdick, L. S.; Campaigne, E. E., and Fancher, O. E. Rate of acid formation in dental caries, the etiology of dental caries. Illinois D. J. 10:85 March 1941.

3. Fosdick, L. S., and others. A new approach to the problem of dental caries control. J. D. Res. 32:486 Aug. 1953.

then rinsing the glass electrode and potassium chloride junction with distilled water and finally blotting both dry with tissue. The plaque sample was placed on the paraffin surface directly over the capillary. The glass electrode was then lowered onto the sample and the pH read.

It was felt desirable to have available also a readily obtainable commercial electrode system for measuring plaque pH since the glass electrodes used by Fosdick and his co-workers (hereinafter designated as the Campaigne electrode) are extremely fragile and difficult to prepare. The Beckman "one drop assembly" glass electrode and a fiber type calomel reference electrode were used in conjunction with both Beckman Model H-2 and Beckman Model N pH meters. The glass electrode was treated with Desicote, a silicone solution, as advised by the supplier. This electrode system was found to respond satisfactorily to a series of standard buffers ranging from pH 4 to 8. The glass electrode was prepared to receive the plaque sample by touching the cup with a slightly moistened cotton applicator which left a minute droplet of water that facilitated the transfer of the plaque sample from the dental instrument to the electrode. The calomel reference electrode was lowered to contact the plaque and the pH was read.

A plated antimony microelectrode, as described by Forscher and others,[4] with a saturated potassium chloride salt bridge to a calomel reference electrode was used with a Beckman Model H-2 pH meter for spot checks of plaque pH *in situ*. For additional spot checking, pHydrion paper having a range of pH 5.2 to 6.6 was used.

Materials • Two dentifrice preparations were used in this study. One, used for the three hour test group and for the seven day group, was a commercially available preparation which was labelled as containing 2 per cent sodium N-lauroyl sarcosinate. The remainder of the test subjects used a dentifrice prepared especially for this study which had the following composition:

Dicalcium phosphate dihydrate	37.4 per cent
Calcium carbonate	12.4
Sodium N-lauroyl sarcosinate	2.0
Tetrasodium pyrophosphate	0.4
Polyols and water	45.9
Flavor and gum	1.9
	100.0 per cent

No specific control dentifrice was issued. The subjects comprising the control group were selected at random and used whatever dentifrice they had been using.

Methods • The Beckman "one drop" glass electrode was chosen for the bulk of the work after the results of cross checks with other methods demonstrated its reliability. This electrode was preferred because of its durability and ease of handling. In one test series, the plaque sample was divided into two portions and the pH was determined on both the Campaigne electrode and the Beckman electrode. The results of this comparison are summarized in Table 1. In another test series, the plaque sample was divided as

Table 1 • Comparison of Campaigne and Beckman Electrodes in measuring pH of plaque *in vitro*

Electrode	No. of readings	Mean pH	Standard deviation	"t"	p*
Campaigne	212	5.53	±0.40	1.056	>25% not signif.
Beckman	212	5.57	±0.37		

*P is the probability of finding a greater difference due to chance.

4. Forscher, B. K.; Paulsen, A. G., and Hess, W. C. An improved micro antimony electrode and pH determination in the periodontal pocket. (Abst.) J. D. Res. 32:646 Oct. 1953.

Table 2 • Comparison of three pH estimations on same plaque samples

	Campaigne electrode	Beckman electrode	pHydrion paper
	5.7	5.5	5.5
	5.2	5.0	5.3
	5.4	5.3	5.2
	5.1	5.1	5.2
	6.2	6.2	6.2
	5.5	5.5	5.5
	5.3	5.3	5.2
	5.5	5.6	5.4
	5.6	5.7	5.8
	5.4	5.3	5.4
	5.0	5.2	5.2
	5.5	5.4	5.5
	5.4	5.3	5.2
	5.4	5.3	5.3
Means	5.44	5.41	5.42

before for two electrometric readings. The sample on the Campaigne electrode was then removed with a piece of pHydrion paper (range pH 5.2 to 6.6) for a third pH estimation. These results are given in Table 2. In a third test series, the pH of the plaque sample was determined in the mouth with an antimony microelectrode and the sample removed for pH estimation with the Beckman "one-drop" electrode. This comparison is shown in Table 3.

Two experimental groups were studied. One group of 66 subjects used a paste dentifrice containing 2 per cent sodium N-lauroyl sarcosinate twice each day for seven days. The second group of 61 subjects used the same type of dentifrice for four months. The test procedure was the same in both studies. Each subject appeared for examination in the morning without having brushed his teeth. A small sample of plaque was removed for pH determination with a Beckman Model N pH meter equipped with a "one-drop" glass electrode. The subject then rinsed his mouth for 30 seconds with 50 per cent (by weight) sucrose solution. Plaque samples were removed every five minutes for 20 minutes. An attempt was made to remove each sample from the same region, but in subjects showing little tendency toward plaque formation, this was not always possible. The most frequent sources of plaque were the labial proximal surfaces of the upper cuspids and lateral incisors, the lingual proximal surfaces of the lower anterior teeth and the proximal surfaces of all first molars in that order of preference. For control values, a group of 130 subjects chosen at random was carried through the same test procedure. No preliminary screening of subjects, as described by Fosdick,[3] was done since this destroys the random nature of the sample.

An additional experiment was carried out in which both control and experimental subjects brushed as before for seven days, brushed on the morning of the eighth day and again after lunch and were subjected to the test procedure three hours after the after-lunch brushing.

RESULTS

It is possible to express the *in vivo* findings in several forms. Other workers[3, 5] have used a graphic representation in which pH is plotted as a function of time.

5. Stephan, R. M. Intra-oral hydrogen-ion concentrations associated with dental caries activity. J. D. Res. 23:257 Aug. 1944.

Table 3 • Comparison of pH obtained with glass and antimony electrodes

	Beckman glass electrode	Antimony microelectrode
	6.1	6.2
	6.0	6.2
	5.4	5.4
	5.0	5.4
	6.4	6.2
	6.1	6.0
	5.7	5.4
	5.4	6.0
	5.7	5.2
	6.4	6.2
Means	5.82	5.82

Table 4 • In vivo results observed in morning study; pH minima after glucose rinse

Item	Groups			
	Control	Sarcoside 7 Days	Sarcoside 4 Months	Sarcoside Fosdick*
Cases	130	66	61	256
Means	5.35	5.37	5.33	†
Std. dev.	±.34	±.42	±.35	†
≤pH 5.2	53	30	26	4
pH 5.3–5.5	47 > (77%)	20 > (76%)	21 > (77%)	9 > (5%)
pH 5.6–5.9	24	11	12	28
≥pH 6.0	6 > (23%)	5 > (24%)	2 > (23%)	215 > (95%)

*Fosdick and others. J. D. Res. 32:486 Aug. 1953.
†Not given in article.

Since different subjects reach their pH minima at different times, calculation of the over-all mean pH at each time interval does not allow accurate evaluation of the extent of acid formation under the test conditions. Consequently, it is preferable to use the minimum pH found for each subject as the basis for comparisons.

A summary of the results obtained in the morning before the subjects had brushed their teeth is presented in Table 4. The mean minimum pH is shown for each experimental group. In addition, the data are organized into pH categories. It is obvious from consideration of either the means of the pH minima or the distribution of the pH minima that no difference was found between the control group and either the seven day or four month experimental group.

Table 5 summarizes, in a manner similar to Table 4, the results obtained from specimens taken three hours after the teeth were brushed. Again there is no difference between the control and experimental groups.

In an effort to establish some possible explanation for the discrepancy between these and earlier findings,[3] a series of duplicate measurements was made to evaluate the effect of the source of the plaque on the pH. In this series, one sample was taken from a proximal surface of an upper tooth, and a second sample was taken immediately from the lingual proximal region of the lower anterior teeth. The comparison is shown in Table 6. A "t" test for the difference between these two means indicates significance beyond the 1 per cent level ($t = 6.000$ for 76 D.F.).[6]

DISCUSSION AND CONCLUSIONS

The results reported herein, which are in agreement with those of a number of earlier workers, show that it is possible to determine the pH of a sample of plaque either *in situ* with an antimony electrode or *in vitro* with a glass electrode of suitable design. It has been our experience, however, that the antimony electrode leaves much to be desired in routine periodic pH determination of plaque material. This type of electrode requires constant restandardization against a known buffer. This is tedious when a reading is made every five minutes. Further, the saturated potassium chloride lead is uncomfortable for the subject; and although the insertion for a single reading usually is tolerated, continued insertion and removal is distaste-

6. Youden, W. J. Statistical methods for chemists. New York, John Wiley & Sons, 1951, p. 119.

Table 5 • In vivo results, three hours after brushing; pH minima

Item	Groups: Control	Groups: Sarcoside
Cases	25	24
Means	5.24	5.36
Std. dev.	±.48	±.38
≤pH 5.2	12	8
pH 5.3–5.5	4 > (64%)	8 > (67%)
pH 5.6–5.9	8	7
≥pH. 6.0	1 > (36%)	1 > (33%)

ful. The greatest drawback to the antimony electrode is the problem of uncertain contact. This can be resolved partly by modifications of design; but, nevertheless, unless the plaque deposit is heavy, it is difficult to obtain satisfactory contact between the material in question and the active surface of the electrode. Poor contact usually can be detected by the erratic behavior of the galvanometer needle.

Before experimental results can be interpreted and conclusions drawn, it is necessary to consider two aspects of the experiment. These are (1) the accuracy of the measurement involved and (2) the extent to which observations on the samples used can be extended to conditions in general. The preliminary experiments described earlier, the cross-checking with two different electrodes and the continual periodic checking of the instruments with a standard buffer lead to confidence in the individual readings. There is no doubt that the true pH of the plaque sample is the pH registered on the instrument. However, using these measurements on small samples as the basis for conclusions concerning the whole mouth, or all the surface plaque in the mouth, may be questionable. The validity of the pH determination as an experimental procedure has been established, but its application as a screening technic is questionable.

When the pH of a plaque is determined by a procedure that requires the sample to be removed from the mouth, no conclusions can be drawn as to the behavior of that sample during the succeeding time interval. If the sample was taken from a region rich in plaque, it would be possible to remove future samples from the same area and so have a continuous experiment. If, however, the plaque supply is meager, further samples must come from other regions and the experiment loses its continuity in time. Moreover, we have shown pronounced differences in the pH of plaque samples from different regions of the same mouth (Table 6).

On this basis, the present authors question the validity of a screening test based on pH changes of plaque. We have found that, while the loose soft plaque of the upper cuspids usually shows the expected pH drop after sucrose rinse, the more solid material from the lingual region of the lower anterior teeth will sometimes exhibit an unexpectedly high pH. This

Table 6 • Comparison of simultaneous samples from upper labial and lower lingual areas; pH readings

Upper	Lower	Upper	Lower
5.2	6.5	6.2	7.4
5.0	6.1	6.0	6.6
5.0	6.0	5.1	6.2
5.1	6.1	5.2	5.9
5.1	5.8	5.4	6.1
5.3	5.7	4.9	5.7
5.4	6.2	6.5	6.9
5.0	5.8	6.2	6.7
5.5	6.1	5.8	6.9
5.5	5.6	5.3	5.3
5.8	5.8	6.0	6.2
5.8	5.6	5.0	5.7
5.4	6.2	5.2	5.6
6.0	5.9	5.3	5.2
5.3	5.3	5.3	5.7
5.0	6.2	5.4	5.9
5.4	6.1	5.5	6.4
5.5	6.0	5.9	6.5
5.4	5.3	5.8	6.5
5.2	6.6		
	Means	5.46	6.06

screening procedure is not sufficiently reliable to support negative results. That is to say, if acid is found, one can be sure acid is present, but, if acid is not found, it cannot be assumed that it is not present elsewhere in the mouth. This conclusion is supported by our experiments in which we obtained samples of plaque having pH values above and below 6.0 with a difference as great as 1.4 pH units when the samples were removed from the same mouth at nearly the same time. This uncertainty is demonstrated also by the fact that quite often the pH for the 10 minute sample will be higher than that for both the 5 minute sample and the 15 minute sample by an amount too large to be explained by experimental error.

Our doubt receives its strongest support from the discrepancy between our findings and those of Fosdick and others in studies of patients who used a dentifrice containing 2 per cent sodium N-lauroyl sarcosinate. Whereas the previous workers report a striking reduction in acid formation after a sugar rinse in subjects using sarcosinate, we find the same pattern of acid formation as in control subjects. The fact, therefore, that Fosdick was unable to find acid when he used this method of determining the pH of plaque is not a proof that no acid is formed since the present authors were able to demonstrate its presence at concentrations above the "danger limit" of pH 5.5 in 77 per cent of their cases.

Although it may be possible to explain this striking discrepancy on the basis of the regions of the mouth from which the plaque was taken, it is readily apparent that the use of the pH of plaque after a sugar rinse as a guide to the therapeutic effectiveness of an "anti-caries" agent has given misleading results. The fact that the presence of acid can be demonstrated on tooth surfaces in those subjects using the test agent is a clear indication that the agent has failed to fulfill the claims made for it. Likewise, the fact that two groups of independent workers using identical methods differ so markedly in results is a clear indication of the shortcomings of the screening procedure in question as a method for the evaluation of caries-control agents.

SUMMARY

1. A study was made of the pH of plaques using different instruments and different types of subjects.

2. It was found that the actual pH measurement of a single plaque sample was reliable.

3. It was found that plaque samples from different regions of the mouth differed in pH.

4. It was found that a dentifrice containing 2 per cent sodium N-lauroyl sarcosinate did not prevent acid formation in the dental plaque.

Help From the Past • In the study of some apparently new problems we often make progress by reading the work of the great men of the past. *C. H. Mayo, "Surgery of the Sympathetic Nervous System," Annals of Surgery 96:481, October, 1932.*

Principles of functional anatomy applied to the making of impressions

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The purpose of this paper is not to present an entirely new technic but rather to point out some of the principles of functional anatomy that should be considered in the making of an impression for (1) a full upper denture, (2) a full lower denture or (3) a distal extension partial denture. Because of the varied ability of individual dentists in the use of different materials, the type of material is not of major importance. An understanding of functional anatomy, however, is a definite aid in impression technics. If the specific anatomy involved is known, then materials are selected and used in order to provide an outline form that will not interfere with the functions of the tongue, the muscles of mastication or the salivary glands.

THE UPPER IMPRESSION

The following are the features of a good upper impression:

1. The impression has the proper distobuccal flange length and proper anteroposterior length.
2. The soft palate is recorded in functional movements.
3. The impression does not impinge on the muscle attachments.
4. The impression provides minimum compression of the soft tissue over the crest and sides of the alveolar ridge.

In making an upper impression, care should be taken to avoid oversized trays and to produce acrylic trays which can be rebased. The procedure is as follows: First, an overextended impression is taken in compound, it is removed from the tray, and the periphery and the anteroposterior length are reduced.

The specific anatomy which must be considered at this point is the close proximity of the maxillary tuberosity to the external pterygoid plate of the sphenoid bone. The distobuccal flange length is determined by locating and recording the perpendicular groove formed by these two bones. Green stick compound is added in the distobuccal area of the prepared compound tray; the patient assists by sucking in and blowing out his cheeks until the perpendicular groove is recorded. Additions of green stick compound are made around the periphery until all the muscle attachments are recorded.

A knowledge of anatomic details of the skull is necessary for the determination of the approximate anteroposterior length and contour of the upper denture. The relation of the internal pterygoid plates to the maxillary tuberosities and the formation of the hamular notch by the tips of each hamulus and the max-

Presented before the Section on Complete Prosthodontics, ninety-third annual session, American Dental Association, St. Louis, September 11, 1952.

illary tuberosities must be observed with care.

The upper outline and the peripheral outline are completed by placing green stick compound across the post-dam area. The final step in the making of the original impression is to record the soft tissue over the hard palate and the alveolar ridge with a zinc oxide paste.

From this original impression, green acrylic trays are constructed. These trays are processed in the same curing time as the finished acrylic denture. The technic is as follows: A stone cast is poured, and a duplicate is made. Two thicknesses of baseplate wax are placed over the duplicated model, and the wax is carved in the form of a denture base without teeth. The acrylic resin is processed and returned to the original cast. This acrylic tray fits very closely and can be corrected for an accurate impression.

In the process of the rebasing of the acrylic tray, the green acrylic tray is placed in the mouth; and all muscle attachments are observed. The tray is trimmed to allow for functional movements of these muscles. The function of the soft palate must be studied with the acrylic tray in position. With the patient saying, "Ah—ah—ah," and panting, a functional action is produced; and the proper length is determined. After the tray is prepared, the procedure is as follows: Green stick compound is added to the distobuccal flange area, and the proper distal flange length is re-established with the patient sucking in and blowing out his cheeks. Green stick compound is added to the periphery between the muscle attachments. The green stick compound is continued across the post-dam area. While the patient says, "Ah—ah—ah," and pants, the green stick compound is removed several times and reheated in order to make an accurate reproduction of the soft palate in function. The acrylic resin is relieved over the crest and sides of the alveolar ridge. Then three small air escape holes are bored, one on each side of the hard palate and one in the region of the anterior palatine canal. The impression is completed with zinc oxide paste.

LOWER IMPRESSION

The following are the features of a good lower impression:

1. Complete coverage of the retromolar pad is provided.
2. The buccal pouch is recorded by functional molding.
3. The buccal periphery in the bicuspid area is determined by the movements of the corners of the mouth.
4. The lingual border of the anterior area is so formed that it does not impede the normal flow of saliva from Wharton's duct.
5. The distolingual extension should not extend beyond the center of the retromolar triangle.

The original lower impression is made carefully, and a green acrylic tray is constructed. The action of the masseter muscle and the attachments of the buccinator muscle are of great importance in the determination of the outline form of the lower denture. The position of Wharton's duct and the horizontal level of the floor of the mouth with the tongue in the position of the occlusal plane determine to a great extent the extensions of the lingual border of the lower denture.

The technic is as follows: An overextended impression is taken in compound. The compound impression is removed from the metal tray; the compound is trimmed and reinforced with heavy wire. The outline of the retromolar pad is recorded with green stick compound. Green stick compound is added to the periphery in the buccal pouch area. The buccinator muscle is pulled forward. The line of force should be toward the corners of the mouth. This step determines the length and width of the periphery in this area. Green stick

compound is added on the lingual periphery up to the cuspid area. With the patient extending his tongue above the occlusal plane so that the floor of the mouth is forced above its normal horizontal plane, the primary impression is completed with zinc oxide paste.

A green acrylic tray is made from the primary impression by the same technic of construction as was used in the making of the green acrylic tray for the upper impression.

In the making of the final lower impression, the green acrylic tray is placed in the mouth; and all overextensions are observed. The tray is prepared so that it does not impinge on any muscle attachments. The steps in the procedure are as follows: The retromolar pad outline is reproduced with green stick compound. With the patient opening and closing his mouth, the exact angle at which the masseter muscle functions is determined. Muscle molding is continued until the observed angle is reproduced in the green stick compound. The outline of the buccal pouch also is reproduced. Green stick compound is added on the buccal periphery in the bicuspid area with the patient moving the corners of his mouth in all directions. The length and width of the lingual periphery are re-established. Green stick compound is not added on the lingual surface from cuspid to cuspid. The crest and sides of the ridges should not be compressed; therefore, the acrylic tray is relieved, and many small holes are made with a no. 6 round bur. The mouth is dried completely, and the final step is recorded with zinc oxide paste.

IMPRESSION FOR A DISTAL EXTENSION PARTIAL DENTURE

Many failures in mandibular and maxillary distal extension partial dentures have been observed. All the principles used in the making of a full impression can be applied to the making of an impression for a distal extension partial denture. The original impressions are made carefully, and the green acrylic trays are constructed so that there is no contact with the remaining teeth.

In the making of an impression for a maxillary distal extension partial denture, the distobuccal flange length, the anteroposterior length and the soft palate in function are recorded. The hard palate and the soft tissues are recorded next with zinc oxide paste. The impression is not removed from the mouth at this time. The hydrocolloid impression material is prepared and placed in a tray which is large enough to include not only the teeth but the entire green acrylic tray. The hydrocolloid impression is taken and removed from the mouth. Through the use of the full denture technic, this full impression will have the detail of the soft tissues of the hard palate and the soft palate recorded in function; through the use of hydrocolloid, it will have the remaining teeth recorded in detail.

In the making of an impression for a mandibular distal extension partial denture, the green tray is prepared; and the retromolar pad, the buccal pouch and lingual periphery are recorded with green stick compound. Compound bite-blocks are built to the proper occlusal level. The zinc oxide paste is used for the detail of the soft tissue. With this impression still in the mouth, the hydrocolloid impression is taken.

COMMENT

Though the scope of this article does not include consideration of vertical relation, rest position, centric position and eccentric position, obviously it is not possible to construct successful dentures from a good impression alone. The outline form of the denture should be developed by the open-mouth technic at a height which approaches the correct vertical dimension for the case. The vertical di-

mension at which the dentures are used is the correct vertical dimension plus the height of the opening required for the bolus of food.

Equally important factors are the position of the muscles, the location of the salivary glands, and the horizontal plane of the floor of the mouth within the working horizontal planes. If these factors are not considered, all the denture borders will be overextended.

SUMMARY

1. The impression technic described in this paper is not a new technic but rather a combination of muscle-molding and nonpressure technics.

2. An understanding of the function of the soft palate is necessary for the making of a good impression of the soft palate in function.

3. Since the action of the buccinator muscle must not be impeded, definite knowledge of the attachments of this muscle is important.

4. An impression for a distal extension partial denture should be made by the same technic as that used for full upper and lower impressions.

704 Bankers Trust Building

Preliminary work in transplanting the third molar to the first molar position

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Since the first permanent molar is the key to occlusion, its early loss is responsible for more subsequent dental destruction than any other one dental ill. The loss of this one tooth, if it is not replaced promptly, is responsible for crippling a great number of young people.

As these young people grow into adult life, the progressive malocclusion results in advanced periodontal disease, dental caries and deformity of the combined dentition. Figure 1 shows a 35 year old patient who had lost her first permanent molars when she was between 13 and 19 years old and never had them replaced. Malocclusion, caries, periodontal disease and temporomandibular joint dysfunction resulted.

The loss of the mandibular first permanent molar may cause a continuous distal migration of the anterior segment of mandibular teeth. As these displaced anterior teeth strike the maxillary anterior teeth more and more linguogingivally, all the remaining molars tip out of alignment, thus causing a deformity of the lower third of the face.

The malalignment after the early loss of the maxillary first permanent molar, though not apparent immediately, results in an equally destructive process. If this upper molar is lost when the individual is

Fig. 1 • Casts of jaws of 35 year old patient who had lost her permanent first molars when she was between 13 and 19 years of age

in his teens, the mandibular teeth separate as the lower first molar moves occlusally into the space. The remaining maxillary teeth also separate with resultant traumatic occlusion.

Dental dysfunction caused by the early loss of any first permanent molar or molars frequently results in temporomandibular joint pain, deformities in the joint structures themselves and loss of joint function.

When the first molar of any growing child is extracted, that child may be crippled for life unless the dentist replaces that molar at once through orthodontic, prosthetic or physiologic means.

One of the following methods may be used in the immediate replacement of the first permanent molar:

1. If the roentgenogram of the patient's third molar shows no root development, and clinical and roentgenographic examinations indicate that the first molar must be removed at once, it is advisable to allow the second and third molars to move or be guided orthodontically to contact the bicuspid as quickly as possible (Fig. 2). These patients usually are less than 12 years of age. If the first permanent molar is lost before the child is 13 years of age, it is unfortunate, but at that age the second and third molars often migrate mesially to contact the second bicuspid, thus closing the gap without the extreme tipping and crippling which occur when the first molar is lost after the child is 13. Figure 3 shows instances of such closure. When the third molar is congenitally absent, the problem is further complicated.

2. If the roentgenogram of the third molar shows a root development of more than one half its expected length, that third molar is about to erupt. The bone around the second and third molars has become fairly firm. The patient usually is 18 years old when third molars have developed to this extent (Fig. 4). These molars will not close the space and remain in an upright position but will tip, and malocclusion will result. In such an instance, the patient's first molar should

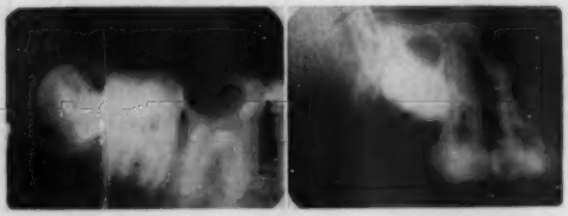

Fig. 2 • Tooth before root development starts; the crown is not completely mineralized

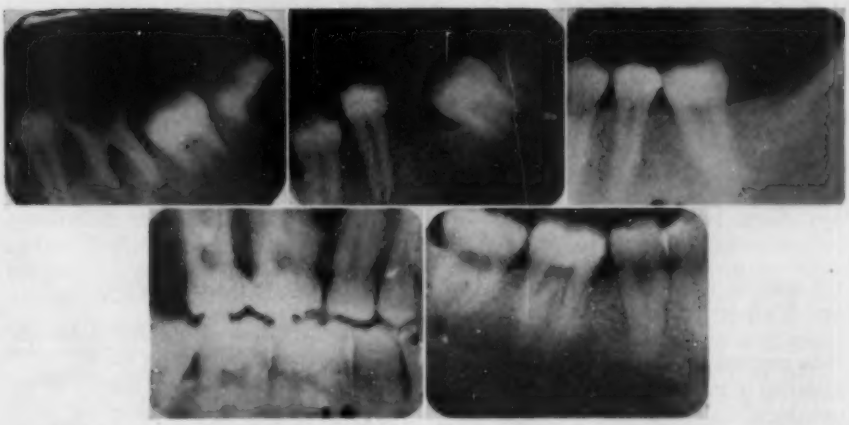

Fig. 3 • Above: First and third molars were removed when child was nine years old. During the succeeding five years the second molar contacted the second bicuspid in an upright position without stimulation or guidance. Below: Complete closure of space with tooth in upright position. Maxillary first molar and mandibular first molar had been removed before the child was 13 years old. No further treatment has been given

be replaced promptly with some form of prosthesis, either fixed or removable.

3. If the roentgenogram shows that the third molar has a root development of from 3 to 8 mm., this molar can be used to replace the first molar by transplantation. These patients usually are between 13 and 18 years old.

Replacement of the first molar with a live, young third molar is a method which most nearly conforms to the natural processes of life.

This paper is presented as a preliminary report on the progress we have made during the past seven years in attempting to develop a method by which live, young third molars can be transplanted to the first molar positions to prevent crippling and future dental degeneration. It is hoped that better technics will be developed which will result in more complete success. As valuable as a third molar is in its normal position, it becomes more valuable if it can be used to replace a first permanent molar which has been lost.

The occlusal anatomy of the three molar teeth in any one quadrant is so similar that these teeth can be used to replace each other. During teen age, when the first permanent molars so often are lost, the third molars have reached

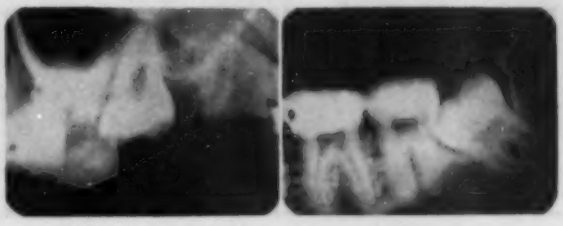

Fig. 4 • Well-developed second and third molars which are attached to surrounding bone by periodontal fibers

Fig. 5 • Tooth is contained in its sac as a complete unit. Its crown is completely mineralized and its roots have started to grow

the stage of development when they are best fitted for transplantation to the first molar positions. They are still encased in their membranous sacs (Fig. 5). They are attached to their surrounding bony crypts only by fibrils and capillaries. No definite artery, vein or nerve has as yet established itself with these teeth.

Sol Bernick[1] of the University of Southern California has noted as follows:

> Nerves do not enter the teeth of monkeys until the migratory stage of eruption. Before such stage, blood vessels are present in the pulp of the developing tooth, yet no nerves are evident. With clinical eruption of the teeth, the nerve fibers are present in the pulp. This coincides with the work of Wasserman, Weatherford, Walford and Hammer which has shown that the tooth germ does not possess nerve fibers until the tooth has erupted into occlusion. Blood vessels and connective tissue accompany the nerves in entering the transplanted tooth. This is as expected as shown elsewhere in the body.

Fig. 6 • Maxillary and mandibular third molars contained in their sacs with operculum and gubernaculum attached

TECHNIC OF TRANSPLANTATION

In transplantation of a third molar the following should be kept in mind:

1. The third molar bud should be removed from its crypt keeping the operculum, gubernaculum and the dental sac intact (Fig. 6).

2. In the preparation of the host site, there must not be any cortical bone plate left lining the root socket of the first molar.

3. If necessary, all buccal and lingual bone may be removed to allow the third molar tooth to assume a good buccolingual position in the first molar socket.

4. The third molar should be buried deeply enough to allow its occlusal surface to be even with the normal crest of bone. Then the operculum will occupy the space vacated by the neck of the first molar. The mucosa will completely heal in most instances.

5. A removable acrylic splint may be constructed during the first postoperative week to fill the space vacated by the crown of the lost first molar. During the succeeding months, the under surface of the splint may be ground away as the third molar erupts.[2]

On some occasions when the third molar is too young to transplant, the first molar may be retained for a few months while the third molar roots develop to 3 mm. in length. It is desirable to trans-

1. Rabinowitch, B. Z., and Bernick, Sol. Personal communication, March 1950.

2. Apfel, H. W. Autoplasty of enucleated prefunctional third molars. J. Oral Surg. 8:289 Oct. 1950.

plant the third molar to the first molar position at the same time that the first molar is removed. Surgical intervention on the tooth bud occasionally results in rupture of the occlusal portion of the follicular sac. If this happens before root growth is well started, that tooth will appear in the oral cavity with a soft crown since calcification of the external surface of the enamel is terminated with the removal of the ameloblastic layer in the enamel organ. Three millimeters of root development in any tooth indicates that the enamel is completely mineralized.

Several patients have been operated on three months after the removal of the first molar and the healing of the alveolar ridge. Figure 7, above left, shows an instance of a transplanted tooth which erupted buccally. Orthodontic treatment was instituted to bring the tooth into line and to rotate it. During this time the roots continued to grow.

A number of third molars have been used to replace first molars in the opposing arches (Fig. 7, above center and right). On one occasion the young maxillary right and left third molars were used to replace the right maxillary first and second molars and second bicuspid (Fig. 7, below).

Figure 8 shows third molars that were transplanted five and six years ago. Though their pulps were alive, they progressively diminished in size as dentin was laid down. Periodontal membrane spaces are evident roentgenographically.

In January 1948 a maxillary third molar whose roots were 3 mm. long was transplanted to the first molar space. Its roots continued to grow. Four years later, in March 1952, it was removed surgically with some of the surrounding alveolar bone. Figure 9 is a photomicrograph of the section after decalcification.

Autogenous replacement of the first molar with the third molar in teen-age young people is acceptable practice if the roots of the third molar have developed to 3 mm. in length. Figure 10 shows third molars which we have transplanted recently.

More than a hundred young people have come under our care and observa-

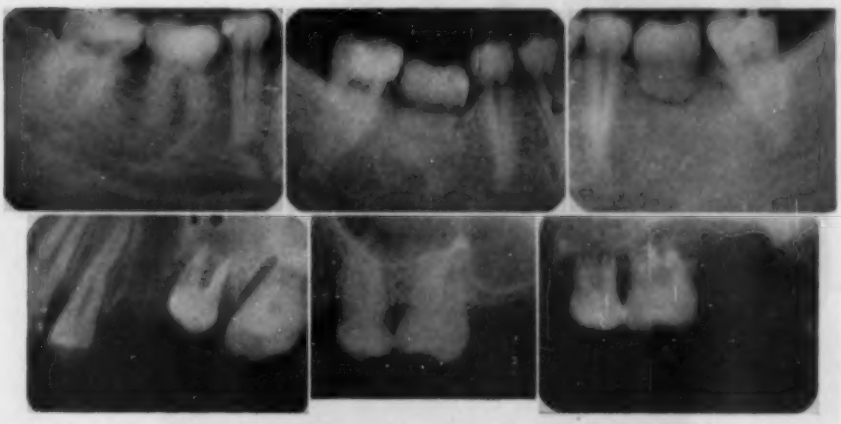

Fig. 7 • Above left: Right third molar which was transplanted in 1948 to the left first molar space three months after first molar was removed. Above, center and right: Maxillary third molars which have been functioning in the mandible during the past four years. Below: Teeth which have been functioning for two years

tion during the past seven years whose third molars have been used to replace their missing first molars with satisfactory results.

COMMENT AND SUMMARY

The first permanent molar is such an important tooth in the dental arch that its untimely loss is often responsible for periodontal disease, caries and the crippling of the dental arches. Its loss also promotes temporomandibular joint dysfunction, causing pain. If, however, the first permanent molar must be lost, the methods of treatment to prevent the crippling of the dental arches may be divided into three types which are based chiefly on the age of the patient and the extent of the development of the third molar.

If the patient is very young, the space will be closed satisfactorily by the second and third molars, or it may be closed by orthodontic treatment.

If the patient is beyond teen age, the space vacated by the first molar should be filled promptly with a prosthetic appliance. If a patient is teen-aged, the space vacated by the first molar can be filled by transplantation of the young third molar bud.

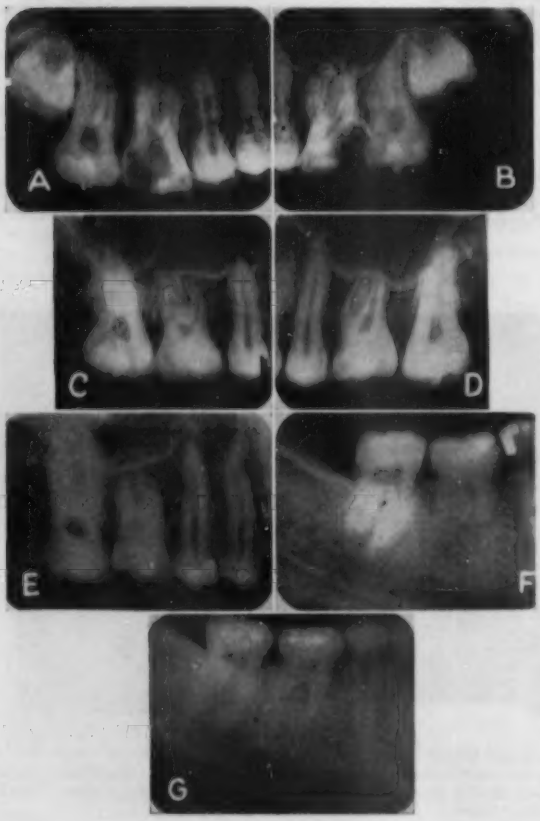

Fig. 8 • A and B: Teeth immediately before transplanting in 1948. C and D: Roentgenograms made in 1952. Third molars have been in function in first molar space since 1949. E: Teeth which have been in function since 1947. F: Tooth was transplanted in 1947; in chewing function since 1948. G: Tooth was transplanted in 1948; in chewing function since 1949

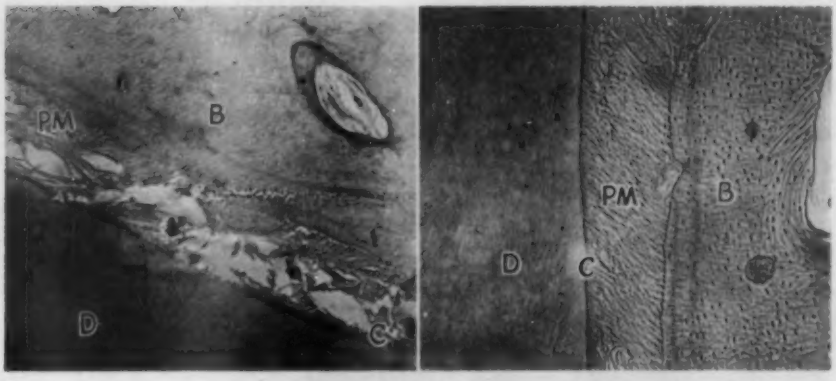

Fig. 9 • B, bone; P.M., periodontal membrane; D, dentin; C, cementum. Attachment fibers can be seen running from the cementum through the periodontal membrane to the bone

Early work by Shapiro,[3] at Columbia and by Nuckolls[4, 5] at California has given proof that tooth-forming tissues in animals will grow after transplantation. The tooth bud in its developing stage is a separate entity, and until the time immediately preceding its eruption it has no direct connection with the rest of the body by artery, vein or nerve.

Autogenous transplantation of tooth buds is physiologically sound, although

3. Shapiro, H. H., and Maclean, Bernice L. Transplantation of developing tooth germs in the mandible of the cat. J. D. Res. 24:93 April 1945.

4. Nuckolls, James. Lobular development and calcification in the tooth. J. California D.A. 17:73 May-June 1941.

5. Glasstone, S. Development of tooth germs in vitro. J. Anatomy 70:260 Jan. 1936.

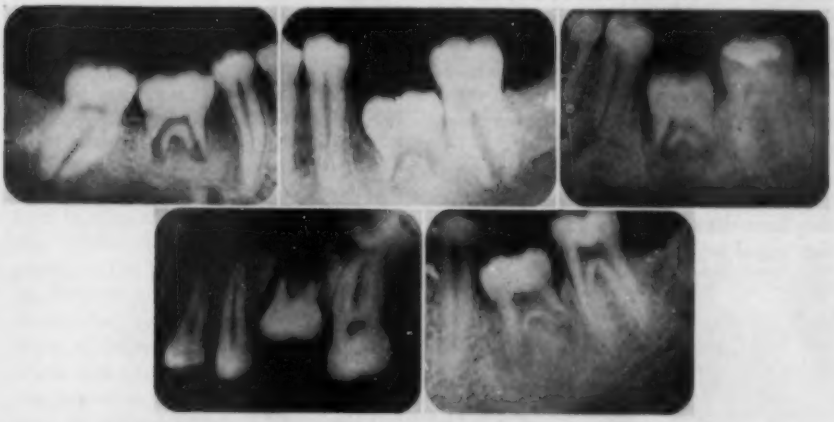

Fig. 10 • Third molars transplanted to first molar position. As shown here, the bone pattern near the developing root ends is similar to that seen in roentgenograms of teeth developing under normal circumstances

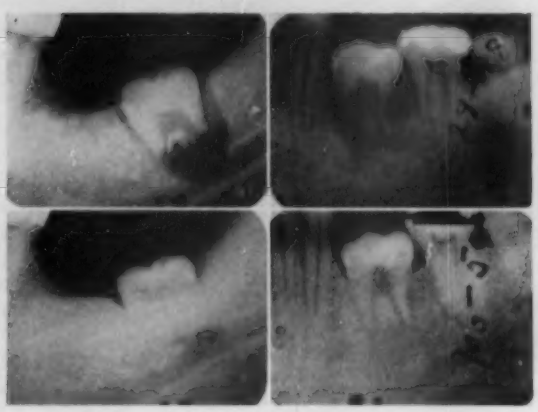

Fig. 11 • Above: Teeth immediately after homogenous transplantation. Below: Same teeth two years later. Note dissolution of tooth structure and replacement by bone

homogenous transplantation (from one individual to another) always fails. Six such homogenous transplantations were done in 1948 using young third molars whose roots appeared to have the desired developmental length. Three of these were transplanted to other teen-aged patients, and three were transplanted from teen-aged patients to adult patients about 30 years of age (Fig. 11). The blood types had been studied. It is believed, however, that this is not related to the problem as it is not related in homogenous skin or bone grafts which also may fail.

If the following conditions are present, the third molar may be used as a replacement for a lost first molar.

1. A third molar must have roots which show roentgenographically that they have developed to a point of bifurcation equal to 2 or 3 mm. This would be just prior to the time when the third molar would normally erupt.

2. The unerupted third molar must be no larger than the first molar which it is to replace.

3. The first molar region should be free from acute infection but not necessarily free from chronic bone destruction such as results from granulomas, chronic abscesses or cysts.[6]

4. The patient must be physically well enough to undergo any minor oral surgery.

Usually the patients are able to return to school on the second day after the operation. There are no serious complications. Antibiotics are used as a prophylactic measure against infection.

18 Street and Grand Avenue

6. Thoma, Kurt. Oral surgery, ed. 2. St. Louis, C. V. Mosby Co., 1952, p. 319-329.

Literature • Books, we are told, propose to instruct or to amuse. Indeed! . . . The true antithesis to knowledge, in this case, is not pleasure, but power. All that is literature seeks to communicate power; all that is not literature, to communicate knowledge. *Thomas De Quincey.*

A comparison of the clinical effectiveness of the higher potency local anesthetics in operative dentistry

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Within the past few years a number of local anesthetic agents have been introduced into dental practice in this country which have been stated to have greater anesthetic potency than the widely used 2 per cent procaine. This increased potency has been attained either by increasing the concentration of a commonly used anesthetic—for example 2 per cent butethamine hydrochloride (Monocaine); by combining a commonly used anesthetic with a more potent although more toxic one—that is, procaine-tetracaine-nordefrin (Novocaine-Pontocaine-Cobefrin); or by introducing an entirely new anesthetic—for example, lidocaine hydrochloride (Xylocaine) or Unacaine.

Although studies of the anesthetic potency and toxicity on experimental tissues and animals are extremely important before these agents can be advocated and used in clinical practice, the more definitive appraisal of their effectiveness remains in the province of clinical testing on human patients. There have been several such studies[1-9] within recent years, some of which may be cited here. Neuwirth and Chilton[1] tested eight different concentrations of procaine using epinephrine or phenylephrine (Neosynephrine) as vasoconstrictors in 865 inferior alveolar nerve injections for mandibular extractions. They concluded that a 2 per cent solution of procaine was the concentration of choice for routine mandibular extractions. Morrison, Rubin and Smith[2] studied 619 mandibular and 967 infiltration injections for operative dentistry, employing 2 per cent procaine and dif-.

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1. Neuwirth, I., and Chilton, N. W. The clinical effectiveness of different concentrations of procaine for mandibular extractions. Oral Surg., Oral Med., and Oral Path. 4:383 March 1951.

2. Morrison, A. H.; Rubin, M. K., and Smith, M. Local anesthetics in operative dentistry. J.A.D.A. 43:17 July 1951.

3. Epstein, S.; Throndson, A. H., and Schmitz, J. L. Comparative study of local anesthetic solutions in clinic and private practice. J.A.D.A. 42:414 April 1951.

4. Winter, L., and Tainter, M. L. Clinical evaluation of local anesthetic solutions of increased strength. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 31:307 May 1945.

5. Lazansky, J. P., and Robinson, L. A study of the effectiveness of Xylocaine as a local anesthetic agent in dentistry. Oral Surg., Oral Med. and Oral Path. 2:1286 Oct. 1949.

6. Bjorn, H., and Huldt, S. The efficiency of Xylocaine as a dental terminal anesthetic compared to that of procaine. Svensk Tandl. Tidskr. 40:831, 1947.

7. Dobbs, E. C. Preliminary report on a new local anesthetic agent. (Abst.) J.D. Res. 30:463 Aug. 1951.

8. Lloyd, R. S., and Blythe, J. O. Jr. Clinical experiences with lidocaine as a local anesthetic. J.A.D.A. 39:296 Sept. 1949.

9. Dobbs, E. C., and DeVier, C. L-arterenol as a vasoconstrictor in local anesthesia. J.A.D.A. 40:433 April 1950.

ferent concentrations of butethamine hydrochloride-epinephrine. They concluded that 1.5 per cent butethamine, epinephrine 1:50,000 was "the best all-around local anesthetic for operative dentistry" of those studied. Epstein, Throndson and Schmitz[5] studied three local anesthetics (procaine-tetracaine-nordefrin, procaine-nordefrin and procaine-epinephrine) under the conditions of a teaching clinic and of private office practice. "Under both sets of environmental circumstances all solutions were effective anesthetic agents." Lloyd and Blythe[6] found lidocaine much more effective than procaine "in the drilling experiments."

The purpose of the present paper is to describe a study in which six "high potency" local anesthetics[10] were employed (as local anesthetics) in operative dentistry:

1. Procaine 2 per cent, tetracaine 0.15 per cent, nordefrin 1:10,000.[11]
2. Ravocaine[12] 0.75 per cent, levoarterenol 1:30,000.
3. Lidocaine 2 per cent, epinephrine 1:50,000.[13]
4. Lidocaine 2 per cent, epinephrine 1:100,000.
5. Butethamine 2 per cent, epinephrine 1:50,000.[14]
6. Unacaine 3.8 per cent, epinephrine 1:60,000.[15]
7. Procaine 2 per cent, epinephrine 1:50,000; used as a standard and supplied by Cook-Waite Laboratories, Inc.

METHODS AND MATERIALS

Seven hundred injections were performed on 191 different patients, 63 males and 128 females, aged 9 to 75 years. In order to make this study as objective as possible, the six test solutions were placed in identical cartridges and codified. Thus, the characteristic metal or rubber caps and the distinctive colored plungers were not present. Each cartridge was marked in quarter sections and contained 2.2 cc. of solution. A double code system was used, so that each solution was represented by two different code numbers. The cartridges were packaged in boxes of six, so that each box contained cartridges representing all six solutions. By means of this packaging arrangement, it was possible to employ the "blind" technic. In a number of instances, all of the test solutions were used on the same patient. The solutions were identical in every respect except for their optical properties. This variation, though slight, was discernible when the solutions were examined side by side against a white background. The color differences could not be detected easily, however, when the cartridges were inspected individually. Therefore, during the entire study, the cartridges were selected by dental assistants who loaded the syringes for the operators.

All injections were performed by two of the authors over a period of one year. This procedure was employed, rather than having the injections performed by dental student operators, in order to minimize errors of technic, observation and recording.

The injection technics were standardized in so far as possible. All injections were timed with a stop watch. Thus, the solution for the inferior alveolar block injection was administered over a 45 second period, utilizing a full cartridge (2.2 cc.). The infraorbital and local infiltration injections were given during a 30 second period, using the contents of half

10. All solutions were packaged and codified by Cook-Waite Laboratories, Inc.

11. Marketed as Novocaine-Pontocaine-Cobefrin by Cook-Waite Laboratories, Inc.

12. Ravocaine is a registered trade name for 2-diethylaminoethyl 4-amino-2-propoxybenzoate which is included in a local anesthetic product distributed by Cook-Waite Laboratories, Inc.

13. Marketed as Xylocaine, a product of Astra Pharmaceutical Products, Inc.

14. Marketed as Monocaine 2% by Novocol Chemical Manufacturing Co., Inc.

15. A product of Novocol Chemical Manufacturing Co., Inc.

a cartridge (1.1 cc.). The zygomatic injections used 2.2 cc. and required 45 seconds for injection. Operative work was started exactly five minutes after the time that each injection was begun.

A record card was maintained for each injection. The following data were recorded on each card: patient's name (or initials), sex, age, weight, cartridge code number, tooth or teeth worked on, procedure of operative dentistry or crown and bridge employed, type of injection, grade of anesthesia, volume injected, induction time, operating time, duration of anesthesia (that was ascertained by means of a postcard, which was filled in by the patient and mailed back to the operator), and untoward reactions. The reverse side of the record card was used for any pertinent remarks. The grade of anesthesia was recorded as A, B, or C. Grade "A" referred to complete elimination of pain during the operative procedure employed. Grade "B" denoted the presence of some pain, but not sufficient to require another injection. The injection had to be repeated with Grade "C."

After 700 injections had been completed (including 100 with 2 per cent procaine as a known standard) a preliminary tally was made according to code number and grade of anesthesia. The various cartridges were then identified, and the information on the 700 record cards analyzed.

RESULTS

Effectiveness of Local Anesthesia • The tabulation of the grades of anesthesia observed for the 700 injections appears in Table 1. The totals of grade "A" anesthesia indicate that the seven solutions fall into three approximate categories. Thus the best group consisted of lidocaine 2 per cent with epinephrine 1:100,000 (88 per cent grade "A"); Unacaine 3.8 per cent with epinephrine 1:60,000 (86 per cent grade "A"); and lidocaine 2 per cent with epinephrine 1:50,000 (84 per cent grade "A"). The next group contained Ravocaine 0.75 per cent with levo-arterenol 1:30,000; procaine 2 per cent, tetracaine 0.15 per cent with nordefrin 1:10,000; and butethamine 2 per cent, epinephrine 1:50,000, yielding 79 per cent, 77 per cent and 77 per cent grade "A" anesthesia, respectively. The poorest results were obtained with the control solution, procaine 2 per cent with epinephrine 1:50,000, since only 61 per cent of the injections produced grade "A"

Table 1 • Clinical effectiveness of local anesthetics tested

	Anesthetic solution	Grade A			Grade B			Grade C			Total injections
		Op. 1	Op. 2	Total	Op. 1	Op. 2	Total	Op. 1	Op. 2	Total	
1	Procaine 2%, tetracaine 0.15%, nordefrin 1:10,000	31	46	77	14	5	19	1	3	4	100
2	Ravocaine 0.75%, levo-arterenol 1:30,000	33	46	79	10	5	15	3	3	6	100
3	Lidocaine 2%, epinephrine 1:50,000	36	49	84	10	3	13	1	2	3	100
4	Lidocaine 2%, epinephrine 1:100,000	38	50	88	7	2	9	1	2	3	100
5	Butethamine 2%, epinephrine 1:50,000	31	46	77	13	6	19	2	2	4	100
6	Unacaine 3.8%, epinephrine 1:60,000	37	49	86	8	4	12	1	1	2	100
7	Procaine 2%, epinephrine 1:50,000	18	43	61	21	9	30	7	2	9	100
	Total	223	329	552	83	34	117	16	15	31	700

Table 2 • Median time of induction and duration of anesthesia

Anesthetic solution	Infiltration		Conduction	
	Induction (minutes)	Duration (hours)	Induction (minutes)	Duration (hours)
1	1	2¼	2	3½
2	1	1¾	2	2½
3	1	2½	2	3¼
4	1	2¾	2	3¼
5	1	1¾	3	2½
6	1	1¼	1½	1¼
7	2	1¾	3	1½

anesthesia. It is interesting to note that though there were differences in the clinical findings of the two observers (who worked independently throughout the entire study) they found identically the same order of effectiveness of anesthesia for the seven drugs.

These data were subjected to a battery of chi square tests and normal curve tests for difference between proportions. It was first found that an over-all difference in results occurred between the observations of the two operators, even though every effort had been made to standardize all procedures. Further testing disclosed that this difference in observations occurred in the case of the 2 per cent procaine standard, with one operator finding the results with procaine significantly different from the results with the higher potency anesthetics (chi square = 23.84 at d = 1) and the other operator finding no significant difference (chi square = 3.01 at d = 1). Analysis of the results of the six test anesthetics disclosed no significant differences among them with respect to clinical effectiveness for either operator (chi square = 5.10 and chi square = 3.11 at d = 5). The data were also analyzed separately according to infiltration (1.1 cc.) and conduction anesthesia (2.2 cc.), and the effectiveness was also studied in terms of these two methods of administration. Again, no significant differences were found between the test solutions, and it would appear that half the amount used for conduction anesthesia is sufficient for infiltration anesthesia.

Induction and Duration • The frequency distributions of induction time and duration were so markedly skewed that the average induction time or duration of anesthesia would have little, if any, meaning. The median (the value on either side of which half the cases occur) values were therefore found (Table 2). The comparative inaccuracy of reporting of duration of anesthesia by various patients is realized, so that the medians referrable to the end of the particular class interval were employed, rather than those which could have been obtained by interpolation. The similarity in induction time for infiltration will be noticed, plus the fact that induction is shorter for infiltration than for conduction, as had been expected. In general, the duration was longer for conduction than for infiltration anesthesias. Lidocaine (with 1:50,000 and 1:100,000 epinephrine), and procaine 2 per cent, tetracaine 0.15 per cent, nordefrin 1:10,000 produced the longest duration; and Unacaine 3.8 per cent, epinephrine 1:60,000, and procaine 2 per cent, epinephrine 1:50,000 had the shortest duration.

Five patients received all seven solutions by infiltration (Table 3), and five others received all seven by conduction (Table 4). Since induction time and duration of anesthesia vary greatly from patient to patient because anesthesia is largely a subjective sensation, an analysis of such data is necessary in order to reveal significance. These data were subjected to such analysis (analysis of variance), and it was found that there was no significant difference (1 per cent level) between the various anesthetics employed in the induction time, but the solutions differed significantly in the duration of anesthesia, both for infiltration and conduction. Again, lidocaine 2 per cent, and procaine 2 per cent, tetracaine 0.15 per cent, nordefrin 1:10,000 had the longest

duration; and Unacaine 3.8 per cent and procaine 2 per cent the shortest.

Untoward Reactions • Reactions to the injection of the various anesthetic solutions were noted after 23 injections. Reactions attributable to mechanical trauma during injection (hematoma, edema, painful injection) occurred in five cases. Reactions attributable to the anesthetic solution (palpitation, perspiration, tremor or fainting) occurred most frequently after procaine 2 per cent, tetracaine 0.15 per cent, nordefrin 1:10,000 (7 cases). In six of these (one patient twice) tremors occurred, accompanied by palpitations. In one case, palpitation occurred accompanied by fainting.

No reactions attributable to the anesthetic solution occurred after Ravocaine 0.75 per cent, levo-arterenol 1:30,000. Two patients experienced tremors (one patient twice) after lidocaine 2 per cent, epinephrine 1:50,000. Three reactions (one instance of tremor with palpitations and two instances of fainting on two separate injections in the same patient) occurred after lidocaine 2 per cent, epinephrine 1:100,000. In addition, in another case with this last named anesthetic, little blebs developed at the site of injection afterwards; this was the only case in the entire study in which this reaction occurred.

Four patients had reactions after butethamine 2 per cent, epinephrine 1:50,000 (one fainted, two had tremors, one with palpitation, and one had palpitation alone). Five reactions were noted after injection of the standard 2 per cent procaine, epinephrine 1:50,000 solution; one patient had palpitations on two occasions, one patient (who had fainted after butethamine 2 per cent, epinephrine 1:50,000) had palpitation, perspiration and fainted, one patient had tremor and one palpitation. No reactions were noted after Unacaine 3.8 per cent, epinephrine

Table 3 • Infiltration anesthesia in five cases

	Induction time in minutes								Duration in minutes							
Patient	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7	Total	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7	Total
1	0.5	0.5	0.8	0.5	0.5	0.8	0.8	4.4	116	59	141	155	158	88	95	812
2	2.0	3.0	1.0	2.0	2.0	1.0	4.0	15.0	90	130	150	105	75	95	(26)	671
3	1.5	1.5	1.0	0.5	1.7	4.5	7.0	17.7	203	108	213	103	82	139	65	913
4	1.5	1.0	1.0	1.3	1.5	1.0	3.0	10.3	179	175	200	120	102	77	75	928
5	1.0	1.0	1.0	1.0	1.0	1.0	2.0	8.0	228	180	265	240	135	90	31	1,169
Total	6.5	7.0	4.8	5.3	6.7	8.3	16.8	55.4	816	652	969	723	552	489	292	4,493
Average	1.30	1.40	0.96	1.06	1.34	1.66	3.36		163.2	130.4	193.8	144.6	110.4	97.8	58.4	

Analysis of variance

Source of variation	Degrees of freedom	Sums of squares	Mean squares	Degrees of freedom	Sums of squares	Mean squares
Between patients	4	16.27	4.07	4	19,069.9	4,767.5
Between anesthetics	6	19.99	3.33	6	59,575.0	9,929.2
Patient-anesthetic interaction	24	24.04	1.00	23	38,649.3	1,680.4
Total	34	60.31		33	117,294.2	

$F = 3.3$ at 6 and 24 degrees of freedom (not significant).

$F = 5.9$ at 6 and 23 degrees of freedom (significant).

Table 4 • Conduction anesthesia in five cases

Patient	Induction time in minutes								Duration in minutes							
	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7	Total	Sol. 1	Sol. 2	Sol. 3	Sol. 4	Sol. 5	Sol. 6	Sol. 7	Total
6	1.2	0.5	3.0	1.5	1.5	1.2	(1.9)	10.8	100	80	200	203	106	76	(89)	914
7	8.0	1.7	2.0	2.0	3.0	1.0	1.8	19.5	207	126	255	195	145	73	157	1,158
8	2.0	1.0	2.5	1.7	2.5	2.0	3.0	14.7	265	145	216	202	149	79	115	1,171
9	3.0	2.3	2.7	1.5	3.5	2.5	4.0	19.5	247	161	104	173	170	68	77	1,000
10	(3.9)	2.0	6.0	1.5	1.0	1.0	3.0	18.4	(253)	205	206	249	135	97	150	1,295
Total	18.1	7.5	16.2	8.2	11.5	7.7	13.7	82.9	1,132	717	981	1,022	705	393	588	5,538
Average	3.6	1.5	3.2	1.6	2.3	1.5	2.7		226.4	143.4	196.2	204.4	141.2	78.6	117.6	

Analysis of variance

Source of variation	Degrees of freedom	Sums of squares	Mean squares	Degrees of freedom	Sums of squares	Mean squares
Between patients	4	8.19	2.05	4	12,962.5	3,240.6
Between anesthetics	6	22.20	3.70	6	83,645.4	13,940.9
Patient-anesthetic interaction	22	41.81	1.90	22	17,152.3	779.6
Total	32	72.20		32	113,760.2	

$F = 1.95$ at 6 and 22 degrees of freedom (not significant).

$F = 17.9$ at 6 and 22 degrees of freedom (significant).

1:60,000. It is interesting to note that these 23 reactions to injections occurred in 15 of the 191 patients in the study (7.8 per cent).

DISCUSSION

In a discussion of the results of this study, certain points need to be emphasized. In the first place, while certain differences in clinical effectiveness were found among the six high potency solutions tested, they could not be demonstrated to be statistically significant in a study of the present size. In the second place, the meaning of "clinical effectiveness" has to be understood. It is necessary to distinguish between the terms "clinical effectiveness" and "anesthetic potency" or profundity. Thus a number of local anesthetics of varying potency may have equivalent clinical effectiveness. If a solution with a low anesthetic potency completely obliterates pain during an operative procedure, then it may be considered to equal the clinic effectiveness of a solution of maximum anesthetic intensity.

With the afore-mentioned factors in mind, it is possible to correlate the findings of this survey with several earlier studies reported in the literature. Epstein, Throndson and Schmitz,[3] employing procaine-epinephrine, procaine-nordefrin and procaine-tetracaine-nordefrin, reported "all solutions were effective anesthetic agents." Winter and Tainter,[4] utilizing similar solutions (of known varying potency), recorded that all solutions gave satisfactory anesthesia and that the differences in degree of anesthesia were not clinically important. These two studies are in harmony with the statistical evaluation of clinical effectiveness of our survey.

The conclusions of Lloyd and Blythe,[5] Lazansky and Robinson,[6] and Bjorn and Huldt[6] (all of whom compared lidocaine with procaine) can be correlated only

with the numerical percentages of Table 1. These authors found lidocaine considerably superior to procaine. In our survey, lidocaine yielded 84 per cent and 88 per cent grade "A" anesthesia as compared to 61 per cent for procaine.

Although it will take many years of clinical practice to determine which local anesthetic is best suited for operative dentistry, a few tentative points may be made. The induction time appears to depend more on the area to be anesthetized than on the particular anesthetic employed. The differences noted both for infiltration and conduction were not statistically significant. The duration of anesthesia does vary with the different solutions used. This is important clinically, since at times the operator would like to perform multiple operative procedures at the same sitting, necessitating a longer anesthesia. By the same token, for an operative procedure of short duration, it is often undesirable to have the area anesthetized for several hours. Not only is the patient subjected to needless discomfort, but the risk of injury to the anesthetized area, by inadvertent biting or other local trauma, must be considered. The return of the anesthetized tissue to normal physiological function as soon as possible should be the goal of the operator.

The test solutions fell into three categories in regard to grade of anesthesia. The poorest was procaine, and the best group consisted of lidocaine and Unacaine. This grouping did not have statistical significance, however. It would thus appear that since the solutions tested appear to produce equivalent results, the choice of anesthetic would depend on the duration of anesthesia desired and the frequency and type of untoward reaction which may be noted with the particular anesthetic employed.

SUMMARY AND CONCLUSIONS

1. Seven hundred injections were given to 191 patients for operative dental procedures. Six high potency local anesthetic solutions, packaged identically and known only by code, were used. A known 2 per cent procaine solution was used as a standard.

2. The seven solutions fell into three categories of clinical effectiveness in preventing pain during operative dentistry procedures. Procaine was poorest. The intermediate group consisted of procaine-tetracaine-nordefrin, Ravocaine 0.75 per cent, and butethamine 2 per cent. The best rating was obtained by lidocaine 2 per cent and Unacaine 3.8 per cent. The differences between the effectiveness of the local anesthetics employed were not statistically significant, however.

3. Half (1.1 cc.) the amount of solution used for conduction anesthesia (2.2 cc.) was sufficient for infiltration purposes.

4. Lidocaine 2 per cent and procaine-tetracaine-nordefrin produce the longest duration of anesthesia, with procaine 2 per cent and Unacaine 3.8 per cent the shortest.

5. Differences in induction time for the various solutions were not statistically significant; however, a more rapid induction occurred with infiltration than with conduction.

6. Untoward reactions occurred most frequently with procaine-tetracaine-nordefrin and procaine 2 per cent. No reactions were noted with Unacaine 3.8 per cent or Ravocaine 0.75 per cent.

7. The choice of local anesthetic to be employed in operative dentistry should be governed by the duration of the operative procedure and the anticipated untoward reactions.

The effect of periodontal treatment on the connective tissue fibers of the marginal gingiva

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The purpose of this paper is to describe changes occurring in the connective tissue fibers of the free gingival margin after the use of gingivectomy and curettage as methods of treatment for periodontal disease. These procedures were accompanied by the Bass[1] technic of personal hygiene. Gingival biopsy at the beginning of the experiment revealed considerable inflammation of the marginal gingiva with almost complete loss of the circular band of connective tissue fibers. After gingivectomy or curettage, the circular connective tissue band regenerated with little sign of inflammation. This healthy condition was associated with strict adherence to the recommended technic for mouth hygiene.

METHODS

The patient, a 39 year old white man, was chosen for this experimental periodontal treatment because on examination of his mouth little calculus was seen, all of his teeth were loose, and pus could be expressed from pockets around all the teeth. The pockets ranged in depth from 3 to 11 mm. A lateral fistulous abscess of long standing was found on the labial surface of the lower incisor region. In spite of the deep pockets and mobility of all the teeth the gingiva appeared relatively healthy. Inflammation was most obvious in the gingival margin near the deep pockets (Fig. 1,A, C). Roentgenograms revealed relatively little evidence of bone loss (Fig. 2). The patient had a medical history of rheumatic disease of eight years' duration for which no specific diagnosis had been made.

Smears were made of pus exuding from representative pockets. Microscopic study of the smears revealed the presence of many polymorphonuclear leukocytes, epithelial cells, red blood cells and bacterial masses.

A gingivectomy was performed extending from the upper right central incisor to the upper right cuspid (Fig. 3). The tissue removed was sectioned and studied microscopically. Removal of the gingiva revealed flat, smooth, very hard, scalelike calculus deposits on all tooth roots. Digital examination had failed to reveal the presence of these masses of calculus in many of the pockets.

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Since the publication of the article, "The connective tissue fibers of the marginal gingiva," by Sumter S. Arnim and David A. Hagerman, J.A.D.A. 47:271 Sept. 1953, two important articles published earlier and describing the same structures have come to the attention of the authors. These are: Feneis, H. Gefüge und Funktion des normalen Zahnfleischbindegewebes. Deutsche zahnärztl. Ztschr. 7:467 April 15, 1952, and Fröhlich, Eugen. Veränderungen im Gefüge des Zahnfleischbindegewebes bei den entzündlichen marginalen Zahnbetterkrankungen. Deutsche zahnärztl. Ztschr. 7:477 April 15, 1952.

1. Bass, Charles C. The necessary personal oral hygiene for prevention of caries and periodontoclasia. New Orleans M. & S. J. 101:52 Aug. 1948.

After the operation the gingival tissue involved was covered with a zinc oxide-eugenol pack which was removed and replaced every three days until the tissue healed. Smears revealed little evidence of exudate from the gingival margin.

was explained to him. He was then given a brush and told to remove them. No special technic of brushing was taught as none of the methods in common use removed the stained bacterial plaques effectively.

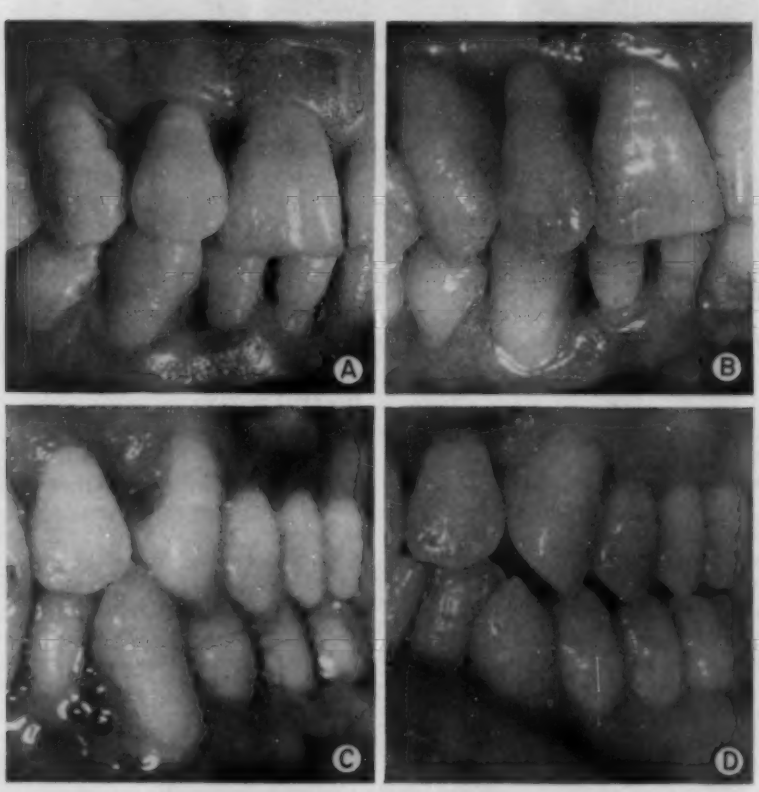

Fig. 1 • A: Upper right quadrant before gingivectomy. B: One year after gingivectomy. C: Upper left quadrant before treatment. D: Upper left quadrant one year later

At this time the bacterial masses on the necks of the teeth were stained with an aqueous solution of 0.15 per cent basic fuchsin. With the aid of a mouth mirror, these masses were shown to the patient, and the irritating nature of these bacterial deposits with their metabolic products

After the patient removed as much of the stained deposits as possible, he was given unwaxed floss and instructed in its use. The floss was worked through the contact areas gently, placed just under the free gingival margin, pressed tightly against the tooth and then drawn oc-

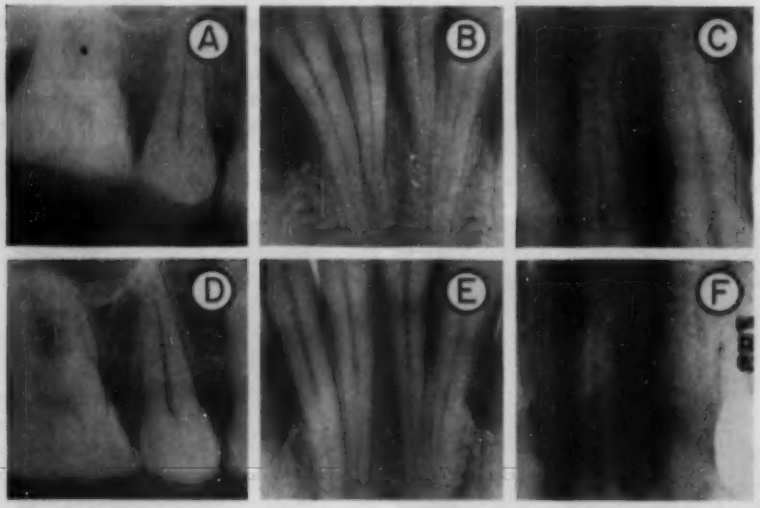

Fig. 2 • A, B and C: Roentgenograms of upper left incisors, lower incisors and upper right incisors before treatment. D, E and F: Roentgenograms after treatment

clusally, cutting the deposit from the tooth surface.

The objective of the use of both brush and floss was to remove all bacterial plaques and other foreign material such as food or soft calculus from the sulcus and the tooth surfaces. The patient was advised to follow this procedure each time he ate and always before he retired for the night. He also was advised to rinse his mouth vigorously after he cleaned his teeth.

The patient was given to understand that the bacterial plaques clinging to the tooth surfaces within the sulcus and at the gingival margin provide the injurious agents that contribute to periodontal disease. He understood that removal of the plaques was necessary in order to maintain the best dental and systemic health and that neglected or inefficient mouth hygiene practices on his part would lead to a recurrence of the periodontal disease.

The patient's understanding of the role which the bacterial plaque plays in periodontitis was improved through the procedure of checking the effectiveness of the home hygienic procedures at each appointment. The check was made by staining the tooth surfaces with basic fuchsin. Bacterial masses revealed by the stain were removed during the appointment by the patient who used floss and brush while the operator held a large mirror for him. The patient soon became so skilled that few deposits remained that required attention during the dental appointment.

About three months after the first gingivectomy, healing appeared complete. Smears from the 1 mm. deep gingival sulcus of the upper right lateral incisor revealed a few leukocytes, epithelial cells and bacteria. The gingiva looked healthy and hugged the neck of the tooth tightly. A second gingivectomy was performed, removing the gingiva from the healed labial surface of the upper right lateral incisor. The tissue was pink, firm and not swollen (Fig. 4, A). It was sectioned and studied microscopically.

Healing was rapid and uneventful.

During the interval from the beginning of treatment until the second gingivectomy was performed the patient was instructed to use the prescribed home care technic in the region operated on and on the upper left side only. In this way it was possible to use the rest of the mouth to demonstrate the difference which resulted from use of the Bass technic. The patient noticed the improvement resulting from the Bass technic and soon

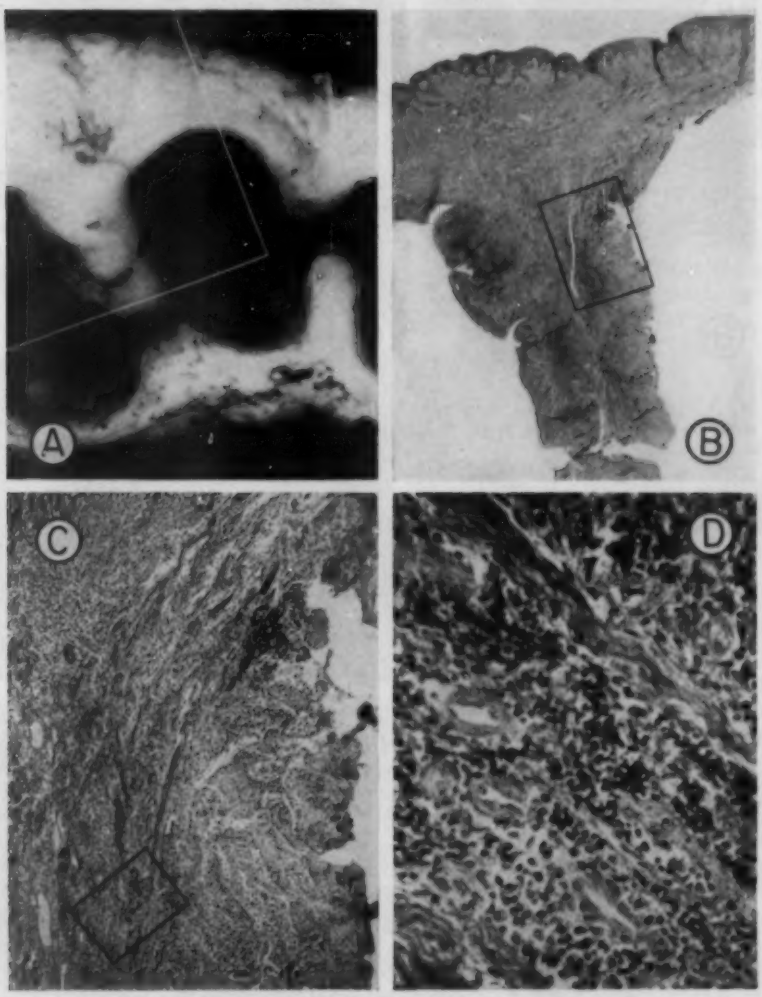

Fig. 3 • A: Inflamed gingiva from upper right lateral region. B: Low power of section made from A. C: Medium power of area marked in B. D: High power of area marked in C

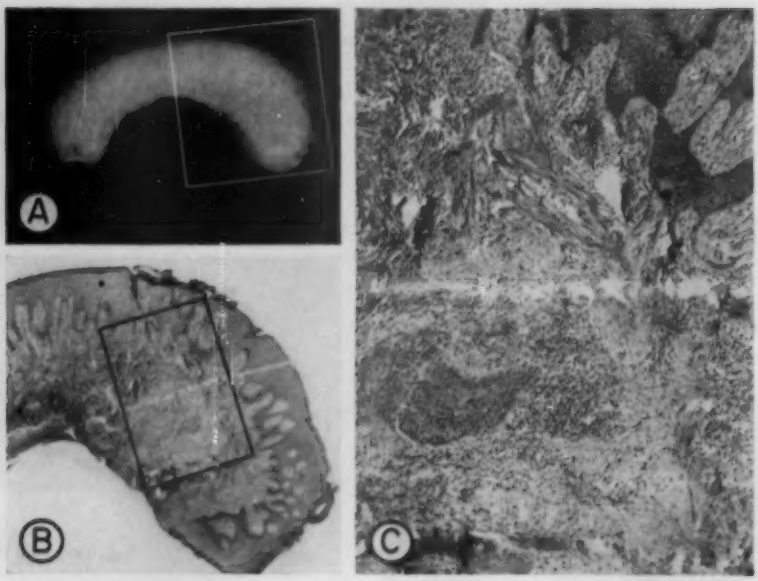

Fig. 4 • A: Healing gingiva from upper right lateral incisor. B: Low power of section made from A. C: Medium power of area marked in C

used it on all quadrants of the mouth.

Conservative, frequent curettage was employed to remove all local irritants in the upper left quadrant of the mouth. Appointments were scheduled once or twice weekly. Signs of inflammation in the gingiva were used as guides to remaining bacterial masses and bits of calculus. The basic fuchsin stain served to show patient and operator where bacteria had not been removed satisfactorily. The objective of the treatment was to remove the bacteria from the sulcus or pocket with the calculus if any deposits were found. The gingiva in this region revealed little evidence of inflammation by the time most bacteria and all calculus were removed.

Nine months after treatment was begun a biopsy was performed on tissue obtained from between the upper left bicuspid and first molar. The tissue was difficult to remove as it hugged the necks of the teeth tightly and was firmly affixed to the alveolar crest of the septal bone. Careful examination of the specimen revealed little evidence of inflammation (Fig. 5, A).

RESULTS

Gross examination of the patient's gingivae and teeth after the treatment described revealed no loose teeth, little calculus (none was seen, but some must have been present in the deepest pockets), no fistulas, little pus, pink firm gingiva hugging the necks of the teeth tightly, no swelling, redness or bleeding. The patient said, "The unpleasant taste is gone from my mouth, especially in the morning, and I feel better than I have for the past eight years."

The appearance of the operated region of the upper right side of the mouth is shown in Figure 1. A maximal loss of

tissue occurred where the gingivectomy was performed. The exposed root of the right lateral incisor was not sensitive. Twelve months after treatment was started, the sulcus was about 1 mm. deep.

Recession was slight on the upper left side of the mouth (Fig. 1). The deep pockets on the root surfaces of the left bicuspids and first molar did not disappear. The pockets seemed shallower than at the beginning of the experiment. Removal of the tissue between the upper left first molar and second bicuspid exposed only 4 mm. of pocket depth, although these pockets were 8 mm. deep at the beginning of the experiment.

Smears for microscopic study from the operated regions revealed a little serous exudate containing a few epithelial cells and polymorphonuclear leukocytes. The amount of material that could be obtained from the sulcus was so slight it was difficult to stain and study microscopically.

Careful study of the roentgenograms revealed no definite indications of bone building. No evidence of continued bone loss was seen.

The gross and microscopic condition of the gingiva at the start of the experiment is shown in Figure 3,A. The ulcerated, swollen edematous nature of the tissue adjacent to the tooth root is seen. Granular nodules fleck the portion of the lingual gingiva that lines the sulcus. The margin of the gingiva is slick, shiny and swollen, revealing the underlying inflammatory changes. The response within the tissue adjacent to the calculus is evident.

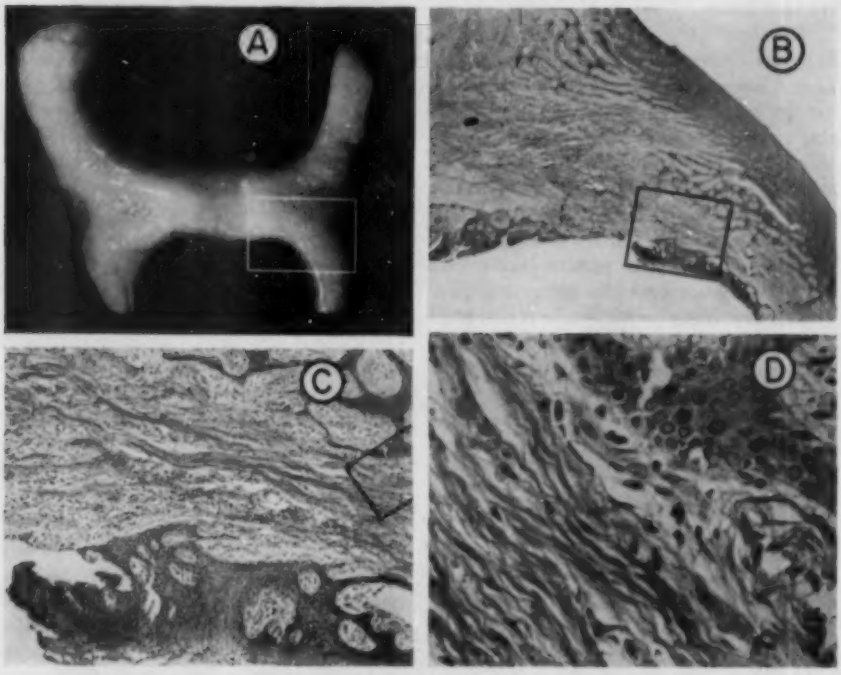

Fig. 5 • A: Gingiva from upper left bicuspid, molar region. B: Low power section made from A. C: Medium power of area marked in B. D: High power of area marked in C

Microscopic sections of this gingiva contained the usual signs of periodontal disease. The epithelium bordering the gingival sulcus is very thin in many places (Fig. 3,B). Numerous tiny ulcers serve as gateways for the outpouring of cellular exudate and capillary hemorrhages. Fingers of proliferating epithelial cells, in strands, clumps and irregular masses, extend deeply into the underlying sea of lymphocytic and plasma cell exudate (Fig. 3,C). The circular band of dense connective tissue fibers, usually seen at this level in healthy periodontal tissue, is not prominent. Remnants of the band are found on the labial and lingual aspects of the teeth. A few fibers remain within the interdental papilla (Fig. 3,D). The over-all picture was one of chronic inflammation of mucous membrane with almost total loss of the supporting connective tissue.

The response of this region to gingivectomy followed by conscientious home care is shown in Figures 1 and 4. Little evidence of inflammation remained at the time the biopsy was performed. A thick, unbroken covering of epithelium was found on the labial surface of the tissue (Fig. 4,B). Serial sections of the specimen contained little inflammatory exudate. Remaining plasma cells and lymphocytes were scattered among new connective tissue cells. These cells contained some mitotic figures indicative of the proliferation associated with the healing process. There was even less cellular exudate adjacent to the tooth surface than on the labial aspect of the tissue. The over-all picture was one of uneventful healing of mucous membrane with regeneration in progress of the circular band of connective tissue fibers (Fig. 4, B, C).

The effect of periodontal treatment using curettage and diligent home care is illustrated in Figures 1 and 5. The enlarged bit of excised tissue shown in Figure 5,A may be compared with that taken from the anterior part of the mouth at the beginning of the experiment which is shown in Figure 3,A. The absence of swelling, ulceration and granular nodules lining the sulcus is indicative of healthy gingiva.

One of the serial sections shown in Figure 5, B, C and D reveals the presence of the circular band of connective tissue fibers lying in the gingival margin. A careful search is necessary in most sections of the series to find the expected chronic inflammatory infiltration that some investigators consider normal at this level of the gingival margin. In addition to the fibers of the circular band, cross sections of free gingival and alveolar fibers are recognized readily.

The continued presence of injurious agents, including bacteria with their toxins, is indicated by the relatively fragile nature of the epithelium lining the gingival sulcus (Fig. 4,B and 5,C). The source of the leukocytes and epithelial cells seen in the microscopic smears is revealed by careful study of these portions of the tissue. Many leukocytes are found between the epithelial cells and on their surfaces but in far less quantity than seen in Figures 3,C and D. The serial sections reveal a sulcus lining relatively intact, in comparison with that present at the beginning of the experiment.

The clinical picture at the end of the experiment was one of healthy marginal gingiva, exhibiting little pus and no bleeding, hugging the neck of the tooth tightly and causing the patient no pain. The microscopic study revealed little infiltration of the corium by inflammatory round cells. The circular band of dense connective tissue was easily seen. The epithelium was supported on tooth and mouth sides by healthy, abundant connective tissue masses. The presence of polymorphonuclear leukocytes in small numbers within the sulcus epithelium and within smears taken from the sulcus indicates that the treatment followed at office and home had not completely

eliminated all injurious agents even though the patient was essentially asymptomatic.

It is admitted, the etiology of periodontal disease is little understood. The importance of thorough removal of all injurious agents from the sulcus and gingival margin has been demonstrated by this experiment. The clinical changes accompanying the mode of treatment are understandable in light of the microscopic findings.

SUMMARY

1. Horizontal serial sections of gingival tissue taken prior to and following periodontal treatment, including gingivectomy, curettage and Bass home care, reveal regeneration of the circular band of connective tissue fibers in the free gingival margin.

2. The resulting healthy condition is associated with strict adherence to the recommended technic for mouth hygiene.

The concept of neutrocentric occlusion as related to denture stability

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The term "neutrocentric" is suggested to denote a concept embodying two key objectives in the making of a denture: (1) neutralization of inclines and (2) centralization of occlusal forces acting on the denture foundation.

In order to attain these objectives, it may be necessary to reduce the size and the number of teeth and to abandon attempts to secure balancing contacts in eccentric positions beyond the range of the "masticatory stroke," a term used in the same sense as it is employed by Hildebrand[1] and Kurth.[2]

Dentures made in accordance with this concept and tested over a long period of time have proved superior to those copying the natural teeth in position, proportion, pitch, form and number of teeth. Abundant clinical evidence, accumulated in 25 years of putting the concept into practice, reveals that dentures thus made achieve (1) surprisingly satisfactory preservation of ridge bone and (2) good appearance, adequate speech and mastication.

The term "denture stability"[3] may require some clarification. A denture is stable when the forces of occlusion do not alter substantially the positional relationship of the artificial teeth to the underlying bone. For a denture to be stabilized,

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2. Kurth, L. E. Mandibular movements in mastication. J.A.D.A. 29:1769 Oct. 1, 1942.

3. DeVan, M. M. Basic principles in impression making. New York D. J. 14:489 Nov. 1948.

the interposed mucoperiosteum must not be subjected to a state of torque. Stability should not be confused with retention. Stability is a tooth-bone relation, while retention is a tooth-mucosa relation. If a denture in function does not lose its adhesion to the mucosa, it is said to possess adequate retention. A denture may possess adequate retention and yet be unstable in function.

The neutrocentric concept should not be identified with that of the advocates of nonanatomic teeth, who merely dispense with cuspation. Experience has shown that it is dangerous to discard cusps without neutralizing other factors of articulation; that is, (1) orientation of the occlusal plane, (2) compensating curve and (3) incisal guidance. These factors concern inclines of the arrangement of teeth, whereas cusps are related to inclines of form. There is only one factor of articulation which cannot be neutralized, but which fortunately can be circumvented by a plan involving the neutrocentric concept. If the patient can be persuaded to avoid incising with artificial teeth, there is no need to be concerned with the sagittal condylar incline. When incision is avoided and no projections exist above or below the occlusal plane, the condylar inclination on the articulator may be set at zero.

If the problem is to stabilize the denture, the teeth must have a relation to the osseous foundation that satisfies the laws of statics. Stability is not necessary for function; a denture to function needs only to be retained. When a denture is unstable, however, the patient may not be able to maintain the initial chewing performance because of chafing and irritation of the mucosa. Furthermore, an unstable denture may prove traumatic to the ridge bone, in time causing its resorption.

The five factors involved in the relation of the teeth to the denture foundations are position, proportion, pitch, form and number.

POSITION

There are three schools of thought relative to the positioning of posterior teeth. One school maintains that molars and bicuspids should be set where the natural teeth were, irrespective of their relation to the underlying residual ridge. A second school advocates setting posterior teeth where they look best, irrespective of the position of the natural teeth. The third school, to which the author belongs, recommends positioning posterior teeth in as central a position in reference to the foundation as tongue function will allow in order to provide greater stability for the denture. If the laws of statics are observed in the making of a denture, the denture will be stable, more of the osseous foundation will be saved by the avoidance of tensile and shearing forces, and the patient will be aided in his accommodation to the denture, perhaps even to the point of becoming oblivious to the fact that the denture is an artificial substitute.

There is probably no single tooth factor as important as position. In dentures that have failed, frequently there is a malposition of the posterior teeth in reference to the confines of the denture foundation. Teeth should be set within foundational bounds whenever possible. Malocclusion is usually stressed as a cause of denture failure; but malposition, occurring because teeth are set beyond foundational bounds, is also an important factor in failure. Clinical observation supports the opinion that the balancing contacts in eccentric positions do not nullify the unstabilizing effect of an off-ridge setup. There is evidence that the employment of lateral balance intensifies rather than alleviates this problem of stabilizing the denture. The expedient of bilateral balance suffices when retention is the only goal. Eccentric bilateral balance does help to maintain retention; but if the use of inclines is essential for its establishment, then bilateral balance causes a decrease

in the stability of the denture. The balancing inclines shift the denture farther toward the side of mastication, preventing its dislodgment while increasing its side displacement.

Bilateral balance in eccentric positions is symptomatic treatment; it is required because of the malpositioning of posterior teeth beyond the confines of the ridge area. If the posterior teeth are positioned within and at right angles to support, the symptomatic relief of eccentric balancing inclines will not be necessary. This is the reason why position is listed in first place in reference to all other tooth factors.

PROPORTION

Another phase of the neutrocentric concept is the use of substitutes that represent a reduction in proportion as related to the size of the natural posterior teeth. A reduction of 40 per cent in width is possible without serious diminution of the food table.

A reduction in width is usually necessary to establish centralization. Otherwise, there would be an encroachment on tongue space. Frictional force also is reduced by a reduction of tooth width, because the surfaces in contact are bathed in a viscid fluid which causes the law of fluid friction to apply. Frictional force is resisted by the osseous foundation as a shearing stress. Every effort should be made to reduce shearing stress falling on ridge bone.

PITCH

Pitch is synonymous with inclination or tilt. A plan based on the neutrocentric concept has a two-fold aim in reference to pitch: (1) to reduce pitch as found in the natural dentition and (2) to parallel the pitch of the occlusal plane with that of the maxillary and mandibular base planes.

Pitch in the natural posterior teeth is determined by two factors: (1) the orientation of the occlusal plane in reference to the condylar incline and (2) the steepness of the compensating curve. In accordance with the neutrocentric concept, the plane of occlusion should be oriented so that it is parallel with the foundational base planes and thus by-passes the condylar incline. In addition, the compensating curve should be neutralized so that the posterior teeth are set on a plane rather than on a spherical surface.

The orientation of the plane of occlusion so that it is midway between and parallel with the mean foundational planes of the maxilla and the mandible is important. Deviation from this mechanical ideal should be made only because of urgent considerations involving esthetics, phonetics or the musculature.

FORM

Artificial posterior teeth should be devoid of projecting cusps. Contacting occlusal lines should be on a single plane. This arrangement is essential to avoid interference from the temporomandibular joints and their inclines. The absence of cusps will result in an unbroken occlusal plane, that is, as far as contacts are concerned; there will be no projections above the occlusal plane that can interfere with movements of the mandible into centric position. There is no scientific evidence to prove that the presence or absence of cuspation makes any appreciable difference as far as chewing capacity is concerned, notwithstanding the claims of those who consider cusp forms sacrosanct. In studies on chewing efficiency of patients with artificial teeth, Manly[4] and Payne[5] have found no provable difference between performances of patients with cusped teeth and those with cuspless teeth.

4. Manly, R. S., and Vinton, Paul. Prosthodontist's problem patients. New York D. J. 18:113 March 1952.

5. Payne, S. Howard. Unpublished manuscript. Read before the Academy of Denture Prosthetics, New Orleans, March 1952.

NUMBER OF TEETH

A reduction of posterior teeth from eight to six teeth per denture is often advisable. A reduction in number may aid in stability by freeing the lower ridge molar incline of occlusion. Furthermore, the elimination of second molars furthers the establishment of centralization.

The elimination of a posterior tooth will prove helpful in the problem of reducing occlusal area without a drastic reduction in tooth contour. There should be no hesitancy in reducing the number of teeth, for this is now the evolutionary tendency; according to Krogman,[6,7] the anthropologist, the human dental formula of 2-1-2-3 is evolving into the formula 1-1-1-2.

DISCUSSION

The failure to perceive the difference between the foundation supporting the natural teeth and that on which the artificial teeth rest is probably responsible for the employment of anatomic tooth factors in artificial dentures. The natural dentition is attached to the bone by means of the periodontal membrane; the artificial denture is attached to the bone by means of the mucoperiosteum. It is the amount of variation between these two membranes in thickness and rigidity that necessitates a departure from a theory based on the natural tooth factors and lends validity to the neutrocentric concept. The task of stabilizing a denture dependent on the mucoperiosteum for support is much more difficult than the task of stabilizing teeth attached to the periodontal membrane. The work of stabilizing is further complicated by the fact that with the artificial denture the support is derived from a surface structure, whereas with the natural dentition the support is derived from a structure embedded within the substance of the osseous mass.

Thus, these three varying factors—thickness, rigidity and site of attachment—render the problem of stabilizing an artificial denture difficult. The neutralization of inclines plus centralization of occlusal forces materially aids stability without interfering with appearance, speech and chewing capacity.

A realization has arisen among prosthetists that if the objective is to minimize the need of rebasing and refitting dentures, the key is to be found in stabilizing them in function.[8]

Dentures possessing anatomic tooth factors in combination with securely sealed borders have been tried conscientiously for some two score years with somewhat disappointing results. If constructed in accordance with the neutrocentric concept, complete dentures are better stabilized and as a consequence require the minimum in the way of retention and subsequent servicing.

In function there is an advantage accruing from the neutralization of inclines. With the inclines neutralized, the slight discrepancies between centric occlusion and centric relation, which may be due to processing or settling of the dentures after wear, will not result in displacement of the mucous membrane each time that the teeth are occluded. If there are no projections above the occlusal plane, the mandible is free to maintain centric relation by a slight shift in position from centric occlusion. This shift is not desirable, but it must be admitted that foundational relations can and do change. Dentures made according to the neutrocentric concept will minimize the degree of mucosal displacement as a result of such changes.

Another advantage of such dentures is that when these changes occur they can be detected easily because there is a dis-

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8. DeVan, M. M. An analysis of stress counteraction on the part of alveolar bone, with a view to its preservation. D. Cosmos 77:109 Feb. 1935.

parity between centric occlusion and centric relation.

Clinical observation supports the hypothesis that inclines are not needed to prevent the mandible from migrating forward. The enveloping musculature will maintain the mandible in centric position as long as there is no pain nor premature contacts due to settling of the dentures.[9]

SUMMARY AND CONCLUSION

According to the neutrocentric occlusion concept, the stabilization of artificial dentures requires deviation from the anatomic tooth factors. Changes from the natural tooth factors are as follows: (1) position is centralized, (2) proportion is reduced, (3) pitch is made parallel to the foundational base planes, (4) the tooth form is cuspless, (5) the number of teeth is reduced. These changes are justified because of the differences between natural and artificial teeth in thickness, rigidity and site of the attaching membranes.

9. Sears, V. H. Principles and technics for complete denture construction. St. Louis, C. V. Mosby Co., 1949.

Prolonged activity of topically administered oxytetracycline (Terramycin) in Vincent's infection: a preliminary report

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The effectiveness of an antibiotic in the treatment of mouth infections is dependent on the pharmacological properties of the drug, the efficiency and speed with which the host defenses act, and the ability of the drug to work in the presence of necrosis.

The organisms of the fusospirochetal complex which are believed by many observers[1-4] to be the infective agent in Vincent's infection of the mouth characteristically produce a necrotizing lesion. The presence of necrotic material in the lesion renders it difficult for both the host defense mechanisms and the therapeutic agents to act. When necrotic material is in the lesion, there is a great tendency for the infection to persist; therefore, removal of necrotic tissue is essential for restoration of host defenses and healing mechanisms. In addition, if the necrosis is severe and lost tissue is not replaced,

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2. Proske, H. D., and Sayers, R. R. Pulmonary infection in pneumoconiosis. Pub. Health Rep. 49:1212 Oct. 12, 1934.

3. Rosebury, T. The etiology of Vincent's infection. In Dental science and dental art, Gordon, S. M., editor. Philadelphia, Lea & Febiger, 1938, p. 415.

4. Shpuntoff, H., and Rosebury, T. Infectivity of fusospirochetal exudates for guinea pigs, hamsters, mice and chick embryos by several routes of inoculation. J. D. Res. 28:7 Feb. 1949.

a space remains in which debris can accumulate and cause reinfection.[5] The inability of the host mechanisms to act is attributed to the fact that areas of necrosis produce low oxidation-reduction potentials so that the aerobic processes necessary for phagocytosis are inhibited or completely prevented. The aim of therapy is to prevent further destruction of tissue and, if possible, to restore tissue that has been lost.[6] An antibiotic, to be useful in the treatment of this infection, must have a broad antibacterial spectrum and low toxicity to the tissues. Any drug that contributes to necrosis obviously should be avoided.

Among the newer antibiotics with a broad antibacterial spectrum available to the medical and dental professions are chloramphenicol, chlortetracycline (Aureomycin) and oxytetracycline (Terramycin). These three antibiotics have a similar spectrum of activity against bacteria, rickettsiae, some virus infections and some protozoan infections.[7]

Chlortetracycline has been used in the treatment of acute alveolar abscesses in children[8] and in the treatment of gingivitis and Vincent's infection.[9-13] The use of chloramphenicol in root canal treatment has been reported.[13,14] No extensive clinical trial of oxytetracycline in the treatment of oral infections has been reported as yet.

Lockwood[15] has pointed out that the limiting factor in the practical usefulness of drugs for the local treatment of infected wounds is the need for a menstruum which will slowly liberate the antibiotic into the wound fluids and obviate the necessity for frequent application. An additional factor necessary for success in the treatment of gingival lesions is the protection of healing tissues from trauma and reinfection caused by food impaction.[6]

Oxytetracycline hydrochloride is soluble to the extent of 10 mg. per 100 milliliters eugenol and retains 100 per cent of its activity in such a solution at the end of three days after storage at 37° C. Under the same conditions (three days at 37° C.) in the presence of zinc oxide, oxytetracycline hydrochloride retains 95 per cent of its activity. This solubility and stability of oxytetracycline in zinc oxide and eugenol suggested the use of this combination of drugs as a surgical pack.

EXPERIMENTS

The following experiments were undertaken to determine the degree of activity of oxytetracycline in combination with a zinc oxide mixture and eugenol. (The zinc oxide mixture consisted of three parts zinc oxide and one part rosin.) The object of the experiments was to determine the amount of oxytetracycline liberated from a standard pellet into tubes of broth during immersion for specified periods of time.

METHODS

Standard Pellets • One gram of dry sterile zinc oxide mixture was mixed with

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7. Pulaski, E. J. The place of antibiotics in the field of surgery. Ann. New York Acad. Sc. 53:347 Sept. 15, 1950.

8. Rovelstad, G. H., and Castaldi, C. R. Aureomycin: its use in treatment of acute alveolar abscesses in children. J.A.D.A. 43:52 July 1951.

9. Cipes, L. R. Aureomycin; report of clinical use in 90 cases of bacterial infection in the oral cavity. New York D. J. 16:450 Oct. 1950.

10. Goldman, H. M., and Bloom J. Treatment of acute ulcerative necrotizing gingivitis with aureomycin. Oral Surg., Oral Med. & Oral Path. 2:1128 Sept. 1949.

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12. Stewart, G. M., and Roth, L. H. Use of aureomycin in oral infections: a preliminary report. J.A.D.A. 40:563 May 1950.

13. Seltzer, Samuel. Combined antibiotic and fungicide paste for elimination of root canal infections. Pennsylvania D. J. 18:33 Feb. 1951.

14. Seltzer, S., and Bender, I. B. Use of chloramphenicol (Chloromycetin) for killing some penicillin-streptomycin-resistant organisms encountered in infected root canals. J. D. Res. 29:825 Dec. 1950.

15. Lockwood, J. S. Local use of penicillin. U. S. Navy Bull. Med. News Letter 4:1 Dec. 8, 1944.

0.5 milliliter of sterile eugenol and 250 mg. of oxytetracycline hydrochloride. Pellets of uniform weight and shape were made from this mixture. A string of sterile dental floss was embedded in each pellet. Control pellets were made without oxytetracycline.

Standard Broth • The test pellets were immersed in Difco dextrose broth. Each test tube was prepared to contain 10 milliliters of broth, and three tubes were used for each determination. The pH of the broth prior to experimental procedures was 7.1.

Time of Immersion • The oxytetracycline pellet and the control pellet were suspended in the first tubes for one hour at a temperature of 37° C. After one hour the pellets were removed, suspended in fresh tubes and immersed for another hour. This transfer system was continued hourly for a total of 24 hours. The procedures were carried out in triplicate.

In a second series of tests the immersion time was set at 24 hours. The transfers in this series covered a span of nine days.

Incubation • All test tubes of the one hour and 24 hour immersion series were arbitrarily incubated at 37° C. for 48 hours after inoculation with the test organisms.

Biological Indicator. • A simple way of determining the amount of active oxytetracycline liberated from the pellet is to inoculate the immersion tubes immediately after removal of the test pellets with an organism which is sensitive to oxytetracycline. For this purpose *Staphylococcus aureus* (Columbia stock culture) was used. In order to eliminate variables in inoculation, the stock cultures were incubated for eight hours at 37° C. and then were removed to the refrigerator and held at 5° C. until the tubes from which the pellets had just been removed were ready for inoculation. Each of these tubes was seeded with two loopfuls of the refrigerated culture.

At the end of the 48 hour incubation, two tubes of each triplicate set were observed for growth and pH changes. The third tube of each triplicate set was incubated for a total of five days. The purpose of the prolonged incubation was to allow additional time for organisms that had not been killed by the antibiotic to grow out; in this way it was possible to distinguish the bactericidal from the bacteriostatic effects.

Equipment • The pH readings were made with a Beckman model G glass electrode, with an accuracy of 0.07 pH unit. The turbidity readings were done with a Rouy-Leitz photrometer (610 micron filter). The blank control broth was used for setting the scale at 100 per cent transmission of light.[16]

Results • The results after 48 hours' incubation appear in Figures 1 and 2. Untreated broth, when tested at the end of 48 hours of incubation, had a pH of 4.5 and yielded good growth. Figure 3 shows results at the end of five days' incubation.

Discussion • Since the antibiotic cement is applied directly to the tissues, it may be inferred that the concentration and activity of the antibiotic are much higher *in vivo* than would be indicated by the *in vitro* method herein described.

The oxytetracycline pellets were definitely more active than the control pellets both before and after the effect of the eugenol alone was demonstrable. Oxytetracycline was being released in active form from this combination continuously throughout the test period.

16. Joslyn, D. A., and Galbraith, M. Turbidimetric method for assay of antibiotics. J. Bact. 59:711 June 1950.

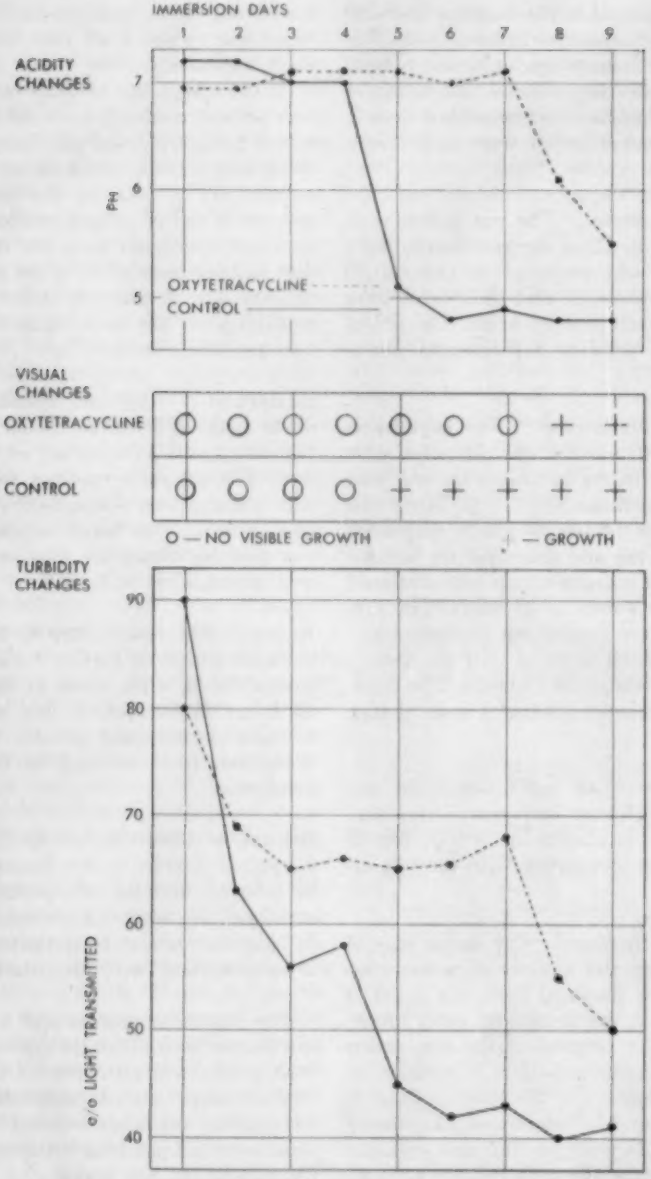

Fig. 1 • Results of bacteriologic tests of release of oxytetracycline from zinc oxide-eugenol pellets after serial daily transfers in sterile broth. After removal of pellet, each tube was inoculated with two loopfuls of the test culture and incubated 48 hours and then examined

CLINICAL TRIAL

In order to evaluate properly the *in vivo* effect of oxytetracycline in this combination in the treatment of Vincent's infection, it was decided to apply the antibiotic pack on one side of the mouth while treating another area with zinc oxide and eugenol alone. In addition to this, one area was left untreated as an additional control. The treatment consisted primarily of flushing with a tap water spray the superficial debris from the gingiva before applying the packs. The teeth were scaled and thorough débridement instituted within a day or two after application of the initial pack. The packs were reapplied after the scaling and débridement. In this way it was possible to study the effects of the drug in the presence and in the absence of subgingival debris. The results of this study are presented in Table 1.

Vincent's infection was diagnosed if the interdental papillae were inflamed, edematous and had a tendency to be necrotic and if this was accompanied by an exudate which appeared as a pseudomembrane as well as by gingival hemorrhage, putrid odor and sloughing of the interproximal papillae.

Healing was considered positive in the initial response when necrosis was eliminated and the tenderness and swelling were reduced. For the second response the criterion was the absence of necrosis and the absence of inflammation.

The initial response prior to débridement indicated that the oxytetracycline pack exerted a significant effect. A comparison of the results obtained with oxytetracycline packs with those obtained with zinc oxide-eugenol packs gives a chi square of 13.6.

Further analysis of the data in Table 1 indicates that after débridement no significant difference exists. This can be seen if a comparison is made of the results obtained with oxytetracycline with those obtained with a zinc oxide-eugenol pack (chi square = 1.91, p = less than 0.20). A comparison of the results obtained with zinc oxide and eugenol packs with those obtained when no packs were used indicates a small difference (chi square = 5.45, p = 0.02).

During the course of the study smears were taken of 20 of the 42 cases, and these were observed under the darkfield microscope before and after treatments. The results as presented in Table 2 are average values.

The darkfield observations are more startling than the clinical results. From a comparison of Tables 1 and 2 it will be seen that a positive clinical response may be associated with only a small reduction of numbers of organisms. There is no positive response when the darkfield picture remains the same as the original; that is, spirochetes ++++, and so on. From the data presented in Tables 1 and 2, it appears that a clinical response is associated with either a large or small reduction in the numbers of organisms. To the extent that this may be a significant relationship, the oxytetracycline pack provided for greater reductions than did zinc oxide-eugenol packs.

DISCUSSION

When penicillin became available to the dental profession, attempts were made to incorporate it in a useful vehicle. Thexton and Dick[17] used a pack of magnesium oxide, olive oil and cotton wool in combination with penicillin. They reported satisfactory results but they had no controls. They did not use penicillin with zinc oxide and eugenol because Shaw, Sprawson and May[18] had reported

17. Thexton, R., and Dick, P. K. Penicillin packs in treatment of Vincent's infection. Brit. D. J. 78:292 May 18, 1945.

18. Shaw, F. E.; Sprawson, E., and May, H. B. Bacteriologic examination of infected dental pulp canals and the use of penicillin in pulp canal therapy. Brit. M. J. 1:551 April 21, 1945.

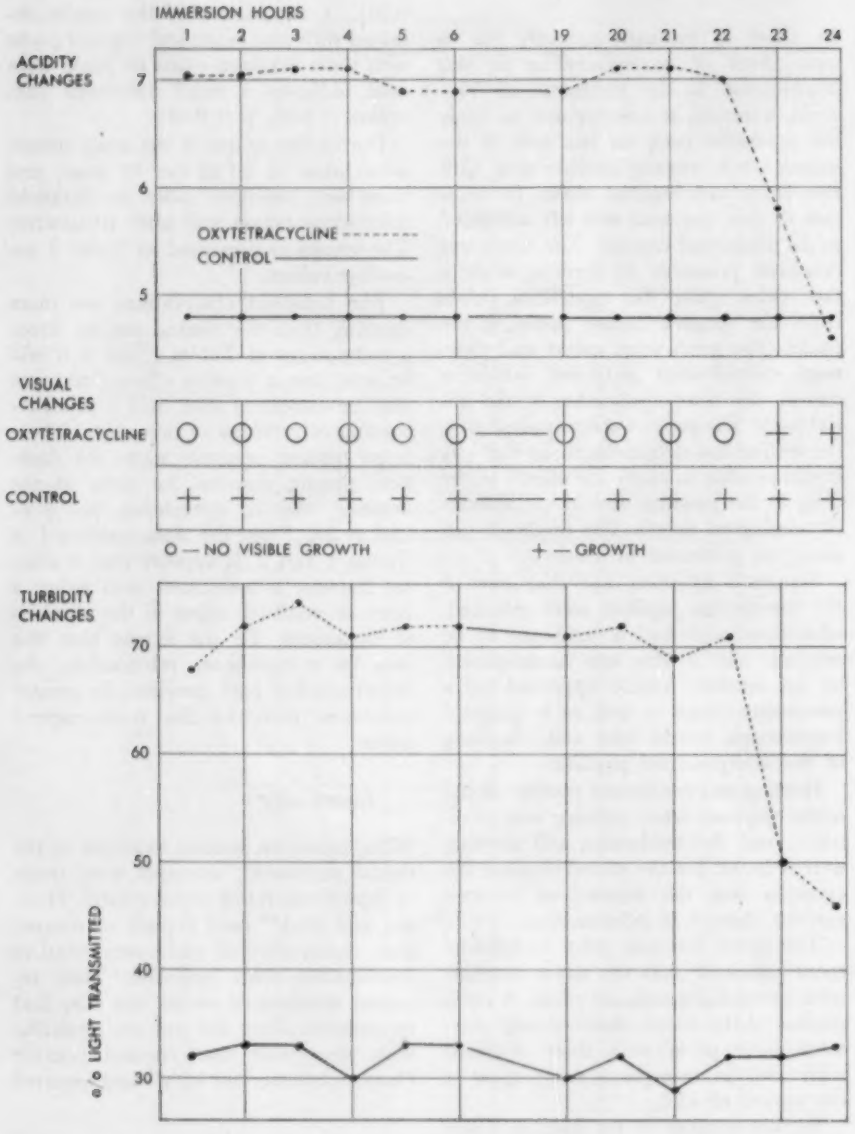

Fig. 2 • Results of bacteriologic tests of release of oxytetracycline from zinc oxide-eugenol pellets after serial hourly transfers in sterile broth. Pellets immersed one hour in each successive tube. After removal of pellet, each tube was inoculated with two loopfuls of the test culture and incubated 48 hours and then examined

that penicillin was inactivated in the presence of zinc oxide and eugenol.

Bartels[19] confirmed the fact that penicillin in low concentration was inactivated by the zinc oxide and eugenol mixture. He found, however, that high concentrations of penicillin added to zinc oxide and eugenol and tested immediately exerted a higher antibiotic effect than the zinc oxide and eugenol alone. This type of test only indicated the immediate activity of the penicillin at the time of testing and did not indicate the degree of activity of penicillin in the mixture over a period of time.

Scrivener and Schantz[20] mixed penicillin with gum tragacanth and, using a powder blower, sprayed a film of this preparation over the infected area. This treatment had to be repeated every four to six hours for a 24 hour period. The menstruum would only adhere to the mucous surface for three to four hours. They claimed excellent results but presented no controls.

Fish[21] reported that zinc oxide and eugenol packs were useful in the treatment of Vincent's infection. He apparently did not have any controls, nor did he indicate that débridement was carried out at any stage of treatment. He emphasized the use of massage after removal of the packs.

Because of the success observed in our study of treatment of Vincent's infection, we extended the method to the treatment of periodontal pockets and used it for the protection of the clot after difficult operations. The packs were employed to prevent food impaction, trauma and infection from breaking down the clot. Oxytetracycline cement was used in pulp capping after carious exposure. It is difficult to establish the same type of controls in studies dealing with pulp

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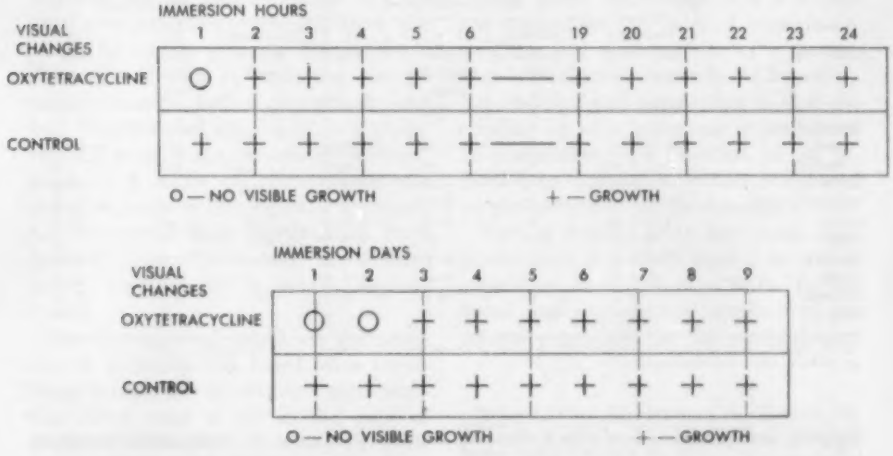

Fig. 3 • Results of bacteriologic tests of release of oxytetracycline from zinc-eugenol pellets after serial daily transfers in sterile broth. Pellet immersed 24 hours and 1 hour respectively in each successive series of tubes. After removal of pellet each tube was inoculated with two loopfuls of the test culture and incubated five days and then examined

Table 1 • Effects obtained with oxytetracycline and zinc oxide-eugenol packs in treatment of Vincent's infection

Initial response 1-2 days after spraying

	Oxytetracycline pack*	Zinx oxide and eugenol pack	No pack
Positive (no necrosis, reduction in tenderness and swelling)	39	24	9
Negative	3	18	37

*One 50 mg. soluble tablet of oxytetracycline was mixed with three drops of eugenol, and sufficient zinc oxide and rosin (3:1) was added to make a soft pack.
Chi square = 55.67.

Second response, 3-4 days after debridement

	Oxytetracycline pack	Zinc oxide and eugenol pack	No pack
Positive (no necrosis, no inflammation)	41	38	33
Negative	1	4	9

Chi square = 7.82.
The critical values for the two sets are at p = .05, 5.99 and at p = .01, 9.21. Hence both values are significant at the p = .05 level.

Table 2 • Microscopic observations before and after treatment

Organisms	Before treatment (all areas)	Initial response (before debridement)			Second response (after debridement)		
		Oxytetra-cycline pack	Zinc oxide-eugenol pack	No pack	Oxytetra-cycline pack	Zinc oxide-eugenol pack	No pack
Spirochetes							
small	++++	O	+++	++++	O	++	+++
medium	++	O	+	++	O	occ.	+
Fusiforms	++++	O	++	++++	O	+	++
Nonmotile rods	++++	O	++	++++	O	+	++
Cocci	++++	+	++	++++	+	+	++
Strep.	+++	occ.	+	+++	occ.	+	+
Vibrios	+++	O	++	+++	O	+	++
Spirilli	+++	O	++	+++	O	+	++
Filaments	++	+	occ.	++	occ.	occ.	++
Cells	+	++	+	+	++	+	++

O = Absent, ++++ = Very abundant, +++ = Moderately numerous, ++ = Scanty, + = Rare, Occ. = Occasional.

capping and prevention of dry sockets as is possible in studies dealing with Vincent's infection and periodontal disease; therefore, the proper evaluation of oxytetracycline as a potentially useful agent in the treatment of these conditions must await more comprehensive studies.

In view of the fact that systemically administered antibiotics prevent the growth of organisms at the outer edge of

the lesion and once the infection has stopped spreading the body defenses promptly go into action, a study is being made of the effects of systemic treatment of periapical abscesses and severe Vincent's infection with oxytetracycline. The initial results confirm the observations of Rovelstad and Castaldi[8] in their study of chlortetracycline. A full report of our studies will be given at a later date.

SUMMARY AND CONCLUSIONS

1. Oxytetracycline mixed with zinc oxide and eugenol was shown to be stable and active both *in vitro* and *in vivo*.

2. Controlled studies have established that the mixture is effective as an adjunct in the treatment of Vincent's infection.

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The fundamentals of occlusion

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Much of the early development of dentistry was inductive, reasoning from the particular to the general. The development of the idea of occlusion can be traced through fiction, hypothesis and fact. The fictional approach, in a philosophical sense, was a convenient arrangement of a series of observations and thoughts, more or less logically arranged. All too often these observations were sporadic, interrelated only by chance, bound together by a single tenuous thread.

The hypothetical attack on the problem of occlusion was based on a provisional acceptance of certain logical entities. These were to fill in the gaps in empirical knowledge and thus tentatively complete the picture. There was a distinct understanding, however, that other discoveries and future experiences must verify them. As Simon[1] said, a hypothesis can be finally maintained only if it does not contradict the facts of experience, which is just the opposite of a fiction. Another difference between the hypothetical and fictional approaches is that the building up of a hypothesis is predicated on plausibility; the selection of an inductive or fictional explanation is based on the usefulness of the concept.

Fact is reality, what has really happened. Fact is a truth known by actual experience or observation. Both the fictional and hypothetical approaches are necessary preludes to the establishment

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1. Simon, Paul. Fundamental principles of a systematic diagnosis of dental anomalies. Translated by B. E. Lischer. Boston, Stratford Co., 1926.

of fact, but must give way wherever contradiction arises. The development of the concept of occlusion thus can be divided into three periods: the fictional period, prior to 1900; the hypothetical period, from 1900 to 1930; the factual period, from 1930 to the present. Obviously, this is a division of convenience. With such an arbitrary chronologic segmentation, the impression is given that there is a distinct cleavage into three distinct entities. The transition was gradual, however, with considerable overlapping, but the trend is undeniable.

There is another trend in the development of the concept of occlusion—the trend from the static to the dynamic. Original concepts of occlusion were those of a completed act—literally an anatomic approach, a description of how the teeth meet when the jaws are closed. "Clusion" means "closing," the prefix "oc" means "up"—thus a closing up. This static approach lasted well into the hypothetical period. With more emphasis on physiology, and recognition of functional disorders, a much broader interpretation of occlusion has developed.

FICTIONAL PERIOD

The first of the three periods in the development of occlusion, the fictional period, like Topsy, "just growed." Pioneers like Fuller,[2] Clark[3] and Imrie[4] talked of "antagonism," "meeting" or "gliding" of teeth. Others relied on anatomic descriptions of the morphology of the teeth as individual units. The creation of a normal standard—a typical relationship, a basis on which to compare departures from the normal—was lacking. Definitions that seemed most useful for the particular writer or particular problem at hand were formulated. In discussing the "norm," Kingsley[5] wrote in 1880:

> Peculiarities of the permanent teeth are recognized by everyone of extended observation . . . because they are a greater or less departure from a normal standard. . . . Such a standard cannot . . . be one shape to which all must conform. . . . The standard of normality of the dental arch is a curved line expanding as it approaches the ends, and all teeth standing on that line.

HYPOTHETICAL PERIOD

Undoubtedly it was Edward Hartley Angle in 1899[6] who crystallized the orthodontic thinking on occlusion and brought the concept out of the realm of fiction. He did much to organize the existing concepts and formulate definite principles of diagnosis and treatment. In 1907, summarizing his views to that date, he wrote:[7]

> Occlusion is the basis of the science of orthodontia. The shapes of the cusps, crowns and roots, and even the very structural material of the teeth and attachments are all designed for the purpose of making occlusion the one grand object. . . . We shall define occlusion as being the normal relations of the occlusal inclined planes of the teeth when the jaws are closed.

He describes the illustration, "Old Glory" (Fig. 1):

> . . . in [Old Glory] which represents all the teeth in normal occlusion, it will be seen that each dental arch describes a graceful curve, and that all the teeth in these arches are so arranged as to be in harmony with their fellows in the same arch, as well as those in the opposite arch. . . . Each tooth . . . helps to maintain every other tooth in these harmonious relations for the cusps interlock and each inclined plane serves to prevent each tooth from sliding out of position. . . .

After describing in detail the anatomic relations of the teeth, Angle furnished us

2. Fuller, John. Popular essay on the structure, formation and management of the teeth. London, Sherwood, Neeley & Jones, 1810.

3. Clark, J. Patterson. A practical and familiar treatise on teeth and dentism. London, A. W. Webster, 1836.

4. Imrie, William. The parents' dental guide: being a succinct treatise on the diseases of the teeth and gums. London, Churchill, 1841.

5. Kingsley, Norman. A treatise on oral deformities, with appropriate preventive and remedial treatment. New York, D. Appleton & Co., 1880.

6. Angle, E. H. Classification of malocclusion. D. Cosmos 41:248 March 1899.

7. Angle, E. H. Treatment of malocclusion of the teeth, ed. 7. Philadelphia, S. S. White Dental Mfg. Co., 1907, p. 7.

with one of the best examples of a hypothesis—his "key to occlusion." He noted that:

> . . . all teeth are essential, yet in function and influence some are of greater importance than others, the most important of all being the first permanent molars . . . they are by far the most constant in taking their normal positions . . . especially the upper first molars . . . which we call the keys to occlusion. We believe that nature so rarely errs in the location of the upper first molars—the very cornerstones as it were in the foundation of the structure of an organ so essential to the whole physical economy as the dental apparatus—as to make it a matter of little or no concern to us except, possibly, in research work.

This hypothesis was the basis of Angle's classification of malocclusion, and it was immediately branded as dogma by contemporary adversaries. Again, Angle noted:

> Writers on orthodontia have long been in the habit of making use of an imaginary line, known as the "teeth in alignment," and the " line of the arch," from which to note regular and irregular alignment of the crowns of the teeth. Two lines are inferred, one for each arch. In the sixth edition the author [Angle] referred to the line of occlusion as "the line of greatest normal occlusal contact." He would now define it as being the line with which, in form and position, according to type, the teeth must be in harmony, if in normal occlusion. The line of occlusion is more than the tangible and material. It may be regarded as the basic ideal of the dental apparatus, the comprehension and appreciation of which will grow in proportion as our knowledge of the science of occlusion unfolds.

This definition created the impression of a static relationship. Terminology had been greatly strengthened and was more precise, but ambiguity, especially in the concept of a "normal," was still present. From the hypothesis of the constancy of the first molar and the line of occlusion, Angle developed the philosophy that it was essential to have all the teeth present in the arches, if normal occlusion was the goal—and that normal facial features were only then possible. Under the influence of Wuerpel, the artist, he developed

Fig. 1 • "Old Glory" which Angle used to exemplify normal occlusion

an affinity for the artistic approach. Facial beauty demanded all the teeth in normal occlusion. Orthodontics either created or destroyed facial contour. To Angle, the orthodontist was an artist, even as the sculptor, molding the facial form through occlusion.

Cryer[8] and Case,[9] Angle's two most formidable contemporary adversaries, had been quick to leap to the attack. Cryer had pointed out that Angle showed the straight profile of Apollo Belvedere (Fig. 2) as his ideal, and that the "Old Glory" skull he chose to exemplify ideal occlusion was taken from Broomell and was the skull of a colored male (Fig. 1). How could one mix a prognathic denture with an orthognathic profile? The norm concept of occlusion, then, would have to take into consideration individual variation. Case in 1905 also took Angle to task for considering bimaxillary protrusions as normal and for not recognizing individual variation. But, like Angle, his concept of occlusion was static. He wrote:

8. Cryer, Matthew. Typical and atypical occlusion of the teeth. D. Cosmos 46:713 Sept. 1904.

9. Case, Calvin. Principles of occlusion and dentofacial relations. D. Items Int. 27:489 July 1905.

Fig. 2 • Apollo Belvidere

Occlusion refers to the closure of the teeth, one upon the other; and normal dental relations, normal occlusion, and typical occlusion refer to the standard anatomical occlusion; the word *normal* means "according to the rule" or "that which is in conformity with the natural law."

Case accepted Angle's hypothesis of the constancy of the first molar as strongly as he rejected the fiction that "normal occlusion and normal facial lines are inseparable." He was aware of dentofacial relations or the relations which the teeth in occlusion bear to the physiognomy. He advised that the terms "protrude" and "retrude," when used in reference to the relative position of the teeth, should always refer to the relation they bear to the normal dentofacial position, not to the normal occlusal position. In 1908 Case[10] again emphasized the static empiric nature of occlusion. He commented,

There has been a recent effort among a certain class of orthodontists to make the word *occlusion* stand for a far wider scope of meaning than any of the lexicographers would think of claiming for the word. The claim is: that when the jaws are in masticating closure, it is improper to say that the teeth are in occlusion unless they close in absolute normal occlusion. And further: it is improper to say that the teeth are in normal occlusion unless the facial outline, supported by the teeth and alveolar arches, are in absolute dento-facial harmony. . . . Normal is a useful word because slight variations from the typical anatomical are "the rule" rather than the exception, as is well known by the difficulty which some authors find in an endeavor to find a perfect illustrative specimen of what they are pleased to term "Normal occlusion" but which, *per se*, is an ideal anatomical occlusion.

This differentiation between normal and ideal has cropped up repeatedly since Case first mentioned it, and the question is far from being resolved today.

Despite almost violent attacks that at times contained personal invective, Angle fended off most arguments and exerted a profound influence on orthodontic thinking and therapy until he died in 1930. His influence by no means died with him—it is very much alive today. Some of our greatest leaders in dentistry at present were trained in the Angle school. But his categorical observations, that bordered on dogma, failed the test of a good hypothesis—that subsequent experience and discoveries verify them. Notable among these observations was the concept that all the teeth must be present to obtain normal facial contour.

The first suggestion of a functional analysis, or a dynamic approach to occlusion, came with some experiments by Bennett[11] in 1908. Bennett wrote, "Now the normal position of rest of the mandible is with the teeth slightly separated, but with the lips easily closed." He noted that the condylar movement was primarily rotatory on opening from occlusion to rest position, "and it is after passing this point that the movement of the condyle seems to become rather suddenly

10. Case, Calvin. A practical treatise on the technics and principles of dental orthopedia. Chicago, C. S. Case & Co., 1908.

11. Bennett, N. G. A contribution to the study of movements of the mandible. Proc. Royal Soc. Med. 1:79, 1908.

considerable" (in other words, translatory). In 1911 Turner, writing from the standpoint of a prosthodontist, again mentioned the concept of physiologic rest.

Lischer[12] and Simon tried hard to broaden the concept of occlusion by relating the teeth to the rest of the face and cranium. While Lischer's definition of occlusion was less precise than Angle's, Lischer did introduce the act of mastication as a requisite. This was definitely a more functional appreciation. Simon and Lischer also related the teeth in occlusal contact to a base plane—Frankfort horizontal—outside the dental area (Fig. 3). Recognition of the interdependence of teeth and occlusion, jaw relationships, and craniofacial morphology, and their effect on the ultimate concepts of occlusion formed the basis of the science of gnathostatics. Simon made strong representations against the acceptance of an arbitrary norm standard in occlusion. Simon[1] observed:

A widely prevalent attitude regards the normal as something real, or natural, something provided for us by the outer world of things. (Angle and his followers.) This is a naive attitude, the product of a primitive mode of thought. It is also dogmatic; conclusions are reached and accepted without hesitation, or verification. Another view is that of the skeptic, who also recognizes the need and justice of a norm-concept. Anomalies are found everywhere . . . hence there must also be a normal. . . . But this, alas, is a delusion—all we ever find are variations, endless variations; an exact, ideal normal does not exist, cannot exist. And this is our enigma; in theory we will never find the normal, in practice we forever feel its need and apply it constantly. . . . After we fully understand the constitutional and environmental influences that form the individual denture; which of these are helpful and which are injurious; which of these may be altered and which are unchangeable—then the fiction of the conception of a normal will of itself become historically useless.

Even as Bennett and Turner had been a step ahead of current dental thought, so Simon, in 1922, was to find that while his recommended mechanical diagnostic procedures were accepted in many circles, his philosophical considerations were passed over altogether, to be resurrected 25 years later. It is well to reread his prophetic words, written over 30 years ago.

A wide experience has taught us that orthodontics does not occupy itself to any great extent with function, but only with the form of dentures. . . . The part which function plays is somewhat platonic. . . . Function is always regarded as dependent on structure, and orthodontists generally consider it as secondary. An orthodontist may urge his patients to use their dentures, especially after the corrective treatment, but he does not subject them to a functional test. He never speaks of articulation, but always of occlusion—his subject is a denture at rest, not one in action. . . . It appears as if our norm-concept were undergoing a transformation—a change for the better. Heretofore we have regarded it as a fiction. But the functional norm, as the physiologist would consider it, is empirically demonstrable; it approaches reality.

12. Lischer, B. E. Principles and methods of orthodontics. Philadelphia, Lea & Febiger, 1912.

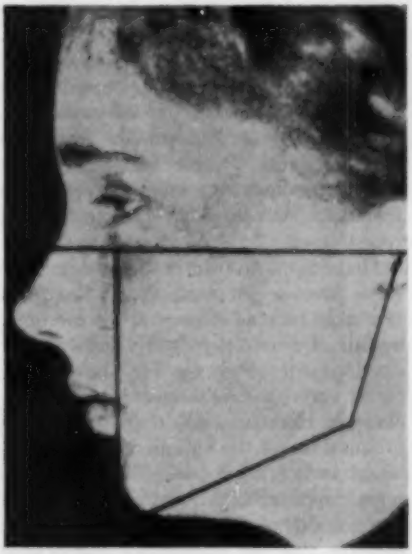


Fig. 3 • Teeth in occlusal contact as related to a base plane—the Frankfort horizontal

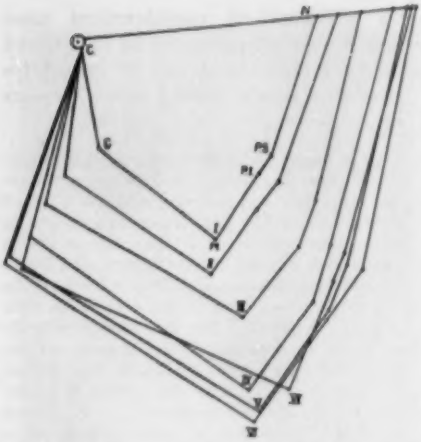


Fig. 4 • Diagrammatic profile projection of face showing changes in position at different stages of development. C, condyle; G, gonion; M, menton; N, nasion; P.I., prosthion inferior; P.S., prosthion superior

Here is the stepping stone to a concept of dynamic occlusion.

Simon saw an approach to a norm concept of occlusion only through biometry, or biologic statistics of variability. He outlined the anthropometric approach which makes use of biometrics. "We must grasp and employ anthropologic methods," wrote Simon. "Orthodontic methods of investigation must then approach those of craniometry and cephalometry."

Hellman[13] saw in anthropology the same promise for method and interpretation of fact as Simon. He drew on a wealth of material to study growth and development (Fig. 4). He showed the racial variations in so-called normal occlusions. Hellman and others studied the prognathism of the human denture in relation to a cranial base. The anthropologic approach, however, despite its recognition of interdependence of the denture and the supporting craniofacial superstructure, was still primarily a static approach as far as occlusion was concerned. The anatomic descriptions of matter-of-fact relationships and involved tables of craniometric measurements on dried skulls exploited none of the functional implications of Bennett, Turner and Simon.

In 1930 occlusion meant "cuspal contact of teeth." Normal occlusion meant a correct cuspal interdigitation, based on Angle's hypothesis of mesiodistal first molar relationship and buccolingual integrity, with the jaws closed together. Although much lip service was being paid to facial balance and harmony, or lack of the same, it was assumed that establishment of a normal occlusion would automatically bring about proper facial contour.

FACTUAL PERIOD

There are good reasons for picking 1930 as the dividing line between the hypothetical and factual periods, between static and dynamic concepts, between ambiguous and precise terminology. The death of Angle in this year removed a powerful sustaining influence for a concept open to some question from factual and functional points of view. In addition, B. Holly Broadbent and Hans Planer appeared on the scene in 1930, bringing a new tool of research and a broader, more physiologic approach. Broadbent[14] introduced an accurate technic of roentgenographic cephalometry (Fig. 5) which eliminated most of the disadvantages of anthropologic cephalometry. For the first time investigators were able to follow longitudinally the developmental pattern and the intricacies of tooth formation, eruption and adjustment. No longer did they have to depend on dried skulls of unknown history and of dubious ethnic origin, age and health backgrounds.

13. Hellman, Milo. The face and teeth of man. J. D. Res. 9:179 April 1929.

14. Broadbent, B. Holly. A new x-ray technique and its application to orthodontics. Angle Orthodont. 1:45, 1931.

Together with the introduction of this improved method of study, came a rebirth of those half-buried and prophetic words of Bennett, Turner and Simon. Planer[15] of Vienna pointed out in 1930 that mere occlusal contact of teeth was not enough. The efficiency of the masticating mechanism and its health depended on certain other fundamental considerations.

First of all, the concepts of physiologic rest position (or occlusal position) must be understood. Physiologic rest position means the resting position which is determined by muscle tone. It is constant throughout life. On the other hand, the physical, or occlusal position [vertical dimension] is variable and may become smaller. If all opposing teeth are lost, it may disappear entirely. When the occlusal position is still normal, and the bite height is therefore normal, one finds that during physiologic rest position, the teeth, which otherwise meet, are slightly out of occlusion. In a normal bite, the difference between the height of the bite of the two positions is slight. The amount of difference is of great diagnostic importance. When physical (or occlusal) bite height has been reduced . . . patients often complain about tiredness in chewing muscles, etc. . . . This happens because the points of insertion of the masticating muscles are closer together. These patients often complain, too, about breakage of prostheses, usually at the same point, breakage of facets, and clicking of the joint.

Planer then went on to tell when bites should be opened and when not, depending on the amount of space between two positions. Unfortunately, so far as this country was concerned, Planer's contribution to the concept of occlusion suffered the fate of all too many European concepts. It took another dozen years before researchers, carrying on independent studies here, were to make similar observations. But occlusion now meant the interdigitation of teeth plus the status of the controlling musculature and functional factors.

In the past 20 years, or since 1930, a third element of occlusion has been considered—the temporomandibular joint. Through the efforts of many investigators,

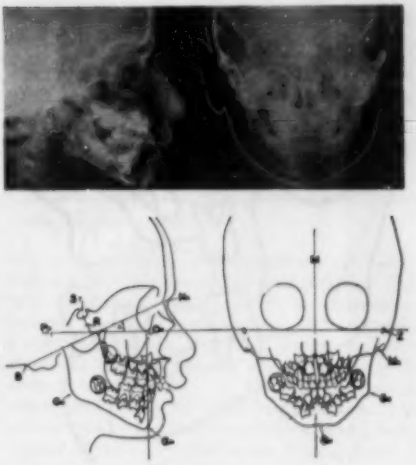


Fig. 5 • Profile and frontal projections according to Broadbent technic

the importance of the role of the temporomandibular articulation in relation to occlusion has been established. There is an intimate relationship between the interdigitation of the teeth, the status of the controlling musculature, and the integrity of the temporomandibular joint, which precludes exclusion of any component in the development of the present concept of occlusion. Considerable controversy exists over the relationship of the condyle and the articular eminence, and the influence on occlusion. But wide agreement exists in the concept of occlusion as a dynamic process—as one which requires the afore-mentioned triumvirate of factors in proper relationship to each other.

FUNCTIONAL PERIOD

Because of the rapid development of a broader concept of occlusion in the last 20 years, the original trends have been

15. Planer, Hans. Die Bisshöhe. Ztschr. f. Stomatol. 28:284 April 1930.

Fig. 6 • Lateral tracing showing posterior superior condylar displacement which results from mandibular overclosure in individual with cleft palate

somewhat accentuated. Factual knowledge has largely replaced the fictional or hypothetical approach. Recognition of the roles played by muscle physiology and the temporomandibular joint has firmly entrenched the dynamic, functional concept. The current controversy is over a so-called "normal condylar position." As Possult[16] aptly put it, there are the McCollum school and the Thompson school. To the McCollum group, two basic conditions must exist in the temporomandibular articulation—the condyle must occupy the most retruded position in the fossa, and the functional action is a hinge movement. To Thompson and his followers, the optimal jaw relationship is with the mandible in physiologic rest. The hinge movement is confined to the lower joint cavity on the opening movement from occlusion to rest position, with translatory movement in the upper joint cavity, beyond the physiologic rest range, combining with the hinge action.

Thompson[17] demonstrated the stability of the physiologic rest position of the mandible by using a large sample of subjects with and without teeth, subjecting them to a roentgenographic cephalometric analysis. The variability of occlusal, or tooth-to-tooth, relationships was recognized and attributed to inherent, environmental or functional factors. Boman[18] and Blume[19] studied individuals with clinically excellent occlusions and those with Class II Division I (Angle) malocclusions and demonstrated the basic hinge or rotatory condylar movement from rest position to occlusion. In 1949 Thompson[20] demonstrated condylar shifts which resulted from tooth guidance or functional overclosure. Graber's[21] study of individuals with cleft palates showed a marked posterior superior condylar displacement as a result of mandibular overclosure (Fig. 6). In 1950 Ricketts[22] made a laminagraphic study of the temporomandibular joint. He demonstrated tomographically the broad range of condyle size, fossa size and depth, and inclination of the condylar path. His most recent work (1952) would seem to indicate that the position of the condyle in the fossa, with teeth in occlusion, is more stable than has been indicated by Thompson. Ricketts[23] claims greater constancy of the occlusal condylar position than the rest condylar position. This would seem

16. Possult, Ulf. Studies in the mobility of the human mandible. Acta Odontologica Scand., sup. 10, 1952.

17. Thompson, J. R. A cephalometric study of the movements of the mandible. J.A.D.A. 28:750 May 1941.

18. Boman, Vernon. A roentgenographic study of the movement of the mandible from physiologic rest position to occlusion of the teeth. Master's thesis, Northwestern University, 1947.

19. Blume, Dayton. A roentgenographic study of the position of the mandible in malocclusion of the teeth. Master's thesis, Northwestern University, 1947.

20. Thompson, J. R. The rest position of the mandible and its application to analysis and correction of malocclusion. Angle Orthodont. 19:162 July 1949.

21. Graber, T. M. Appraisal of developmental deformities in cleft-palate and cleft-lip individuals. Quart. Bull. Northwestern Univ. M. School 23:153, 1949.

22. Ricketts, Robert. Variations of the temporomandibular joint as revealed by cephalometric laminagraphy. Am. J. Orthodont. 36:877 Dec. 1950.

23. Ricketts, Robert. A study of changes in temporomandibular relations associated with treatment of Class II malocclusion (Angle). Am. J. Orthodont. 38:918 Dec. 1952.

to be in substantial agreement with Boman's[24] recent follow-up report on his 1947 study showing that the malocclusion of the teeth is corrected in the Class II group, but that the condyle remains in a more posterior position at rest and occlusion. Boman attributes this more retruded position of the condyle to condylar growth during orthodontic therapy.

During the past 20 years it has become increasingly difficult to maintain an isolated orthodontist's, periodontist's, or prosthodontist's point of view. Today it is impossible. The factual basis of occlusion has developed so far, especially in the last decade, as to make the current concept of occlusion untenable without contributions from each field. Nevertheless, there still remains a considerable body of fictions and hypotheses nurtured by clinical interpretations and a mechanistic philosophy. The present concept of occlusion must be founded on fact wherever possible, and the gaps in knowledge must be closed with tenets which are plausible and open to verifiability in the future—these tenets must not be accepted because of their convenience or usability.

"Occlusion" is now a long way from meaning just the cuspal contact of opposing teeth. Occlusion is not a *fait accompli*—the end result—a finished action. Rather, this maximal contact of opposing cusps is a momentary phase of the masticatory cycle, and is all too often unreliable. There are more stable relationships. In reality, occlusion now embodies three major components: (1) the interdigitation of the teeth when they are in contact (this includes the axial inclination of the teeth as well as the integrity of the supporting structures and occlusal equilibration); (2) the temporomandibular morphology (relations of eminentia, disk, condyle, articular connective tissue, post articular tubercle) and the functional pattern; (3) the status of the controlling musculature—tonic, clonic, controlled, strained, unstrained, and so on. A fourth factor might well be added as a qualifying component —the anteroposterior development of the maxilla and mandible. An abnormal deviant in any factor must produce repercussions or compensatory changes in one or more of the other factors.

Thompson[25] outlines three basic positions of the mandible.

> They [the positions] are physiologic rest position, occlusal position and centric position. The rest position of the mandible is dependent entirely upon the musculature. All functional movements of the mandible begin and end with rest position because the musculature is then in equilibrium. . . . The rest position is established before the teeth have erupted. It is not altered by the eruption of teeth, and a high degree of stability exists in the resting position after the teeth have been lost.

Thompson points out that as with any other physiologic entity, there are variables in rest position—fatigue, hypotonicity, traumatic or trismatic hypertonicity are examples. To these undoubtedly may be added adaptive or compensatory changes which result from growth disturbances, temporomandibular joint pathology or abnormal tooth interdigitation. Nevertheless, the role of the musculature is of two-fold importance—first, as a motivating agent in function; second, as a postural and stabilizing adjunct. Recent research in electromyography confirms a simultaneous assumption of both roles.[26]

The occlusal position is established when the mandibular teeth move into contact with the maxillary teeth. This is a transient terminal point of mastication and deglutition, difficult to maintain for any length of time because of the increased demands on muscular activity. Actual cuspal contact during func-

24. Boman, V. R. Research studies on the temporomandibular joint; their interpretation and application to clinical practice. Angle Orthodont. 22:154 July 1952.

25. Thompson, J. R. Functional considerations of the stomatognathic system. Unpublished, 1952.

26. Geltzer, Bernard. A study to develop a standardized method by which electromyographic data may be recorded. Northwest. Univ. Bul. 54:4 Dec. 21, 1953.

tion is primarily a dynamic gliding of incline on incline, unilaterally. The major tooth-to-tooth contact is not the accepted centric occlusion. Indeed, the bolus of food keeps maxillary and mandibular tooth contact to a minimum until just before deglutition. To relate casts in so-called centric occlusion is purely a static maneuver, arbitrarily selecting the terminal phase of the functional or stomatognathic cycle because of the mechanical interlocking. The variability of this occlusal position, however, is infinitely greater than is the variability of the physiologic rest position. Masticatory habit patterns, tooth malpositions, functional premature contacts, faulty restorations, tooth loss, basal bone dysplasias and the inherent stability or instability of the periodontal structures all affect this position. It is by far the least reliable of the three mandibular positions. When the positions of the teeth are anatomically and functionally correct, when muscular control is normal, and when there is no temporomandibular joint pathology, the occlusal position should coincide with the centric position.

According to Thompson:

> . . . Centric position . . . not only is that maxillomandibular relation where the teeth should occlude in the normal or good functional situation but also where the condyle of the mandible is in a balanced position in the mandibular fossa. This balanced position exists when the condyles are in their unstrained retruded positions in contact with the fibrous tissue forming the posterior walls of the articular *fossae* and when the antero-superior surface of the condyle is in close approximation to the postero-inferior surface of the articular eminence with the thin central portion of the articular disc interposed.

The "unstrained retruded" position is a departure from earlier descriptions by Thompson of condylar position and is possibly a concession to the advocates of the McCollum school for whom "retruded" is the most important positional characteristic. This definition goes a long way toward resolving the controversy in nomenclature of centric relation. If "retruded" is qualified by "unstrained," and if the condyle assumes a position approximating the posteroinferior surface of the eminence, the concept is sufficiently broad to satisfy both schools, though the clinical interpretation may vary. Nevertheless, since through usage "retruded" has developed the connotation of "forced retrusion" and since semantically "retrusion" is the opposite of "protrusion," there are some investigators who would substitute the word "neutral" or "balanced" for "retruded" in the Thompson definition. "Forced retrusion" is anatomically and physiologically impossible, as shown by Sicher in 1948.[27] Clinical experience by the author in palpating the masseter muscle during normal closure and forced retrusion shows considerably diminished contraction in the retrusive action. Pruzansky's[28] recent observations on major changes in muscle activity with only slight forced retrusion raise grave doubts as to the advisability of procedures involving any degree of forced retrusion. Electromyographic tracings of temporal and masseter muscle contractions (Fig. 7) indicate by the magnitude of the "spikes" (vertical recordings) that, whereas the middle and posterior fibers of the temporal muscle are increased by slightly retrusive occlusion, the masseter muscle is suddenly decreased to a level only a little above tonal contraction.

Other researchers might challenge as ambiguous the indication of the position of the condyle as in contact with the fibrous tissue forming the posterior walls of the articular fossa. To some, this would mean the glenoid fossa; to others, the fossa of the lower joint cavity. An alternate definition might be that centric position is the unstrained neutral position where the anterosuperior surfaces of

27. Sicher, Harry. Oral anatomy. St. Louis, C. V. Mosby Co., 1949.

28. Pruzansky, S. Unpublished research, University of Illinois, 1953.

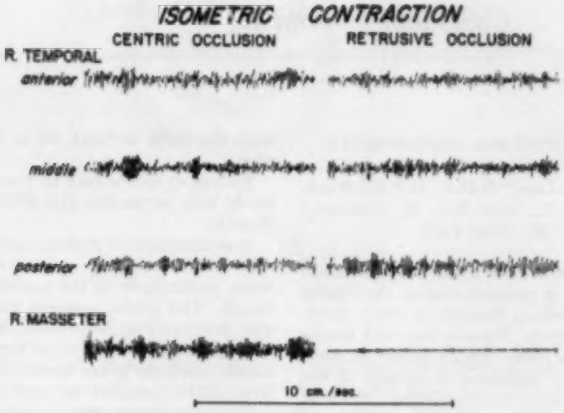


Fig. 7 • Myographic recordings, in centric occlusion and in slightly retrusive occlusion, comparing contractions of temporal and masseter muscles

the mandibular condyles are in contact with the concavities of the articular disks as they approximate the posteroinferior third of their respective articular eminentia. If the variation of condylar size, fossa size, condyle position and inclination of articular surfaces shown by Ricketts is valid, such variation must impose a broad interpretation on any definition. It is entirely proper to imply a range of normalcy—not a point of normalcy.

SUMMARY

Thus, the original static anatomic concept of a central occlusal position of optimal cuspal contact has given way to a broader dynamic interpretation of occlusion. Occlusion is made up of three components: interdigitation of teeth, not necessarily in the central position, since this is only a transitory phase of the functional cycle, status of the controlling musculature, the temporomandibular joint morphology and action. Qualifying factors in this concept are the three positions of the mandible: physiologic rest position, dependent on the musculature; occlusal position, dependent on inherent developmental factors, periodontal integrity, masticatory habit patterns and individual tooth positions; and the centric position, primarily dependent on the temporomandibular joint relations. The interaction of all three components of occlusion in establishing the three mandibular positions cannot be overemphasized. No one factor alone is enough.

The final answers still remain to be formulated. As the philosopher Frederick Jensen has said:

> What we think we know today shatters the errors and blunders of yesterday and is tomorrow discarded as worthless. So we grow from larger mistakes to smaller mistakes—so long as we do not lose courage. This is true of all therapy; no method is final.

Cases and Comments

A PLASTIC RETAINER FOR COTTON ROLLS

By Frank E. Law, D.D.S., M.P.H., Washington, D. C., and Ross E. Gutman,† D.D.S., M.P.H., New York*

An appliance was devised which helps to maintain cotton rolls in position during the topical application of sodium fluoride or other medicaments to the teeth. Various sizes and shapes of this appliance were tested; many of them were used by the personnel on several of the topical fluoride demonstration units. Much of the credit for the determination of the final form goes to these various workers.

A precise technic is required when sodium fluoride is applied to the teeth of children as a partial caries preventive. Four applications are necessary, the first of which is preceded by a cleansing of all tooth surfaces. Each application is made as follows:

1. The teeth are isolated with cotton rolls and care must be taken to insure that the rolls are not in contact with the teeth.
2. All tooth surfaces are dried with compressed air at about 25 pounds air pressure.
3. All tooth surfaces are wet with a 2 per cent solution of sodium fluoride.
4. The fluoride solution remains in contact with the tooth surfaces for at least four minutes.

Failure to follow each of these steps meticulously will jeopardize the effectiveness of the fluoride.

It is sometimes a problem to keep the cotton rolls from coming in contact with the upper teeth, particularly in the posterior part of the mouth. The plastic retainer (see illustration) was developed to help solve this problem. It does not supplant the metal cotton roll holder which holds the lower cotton rolls in position. The plastic retainer is used in addition in order to maintain the position of the upper roll, whether it is separate or a continuation of the lower buccal roll.

The retainer is made of clear plastic material which is stable in any of the commonly used cold sterilizing solutions. The clear plastic permits the operator to see the teeth and the position of the roll.

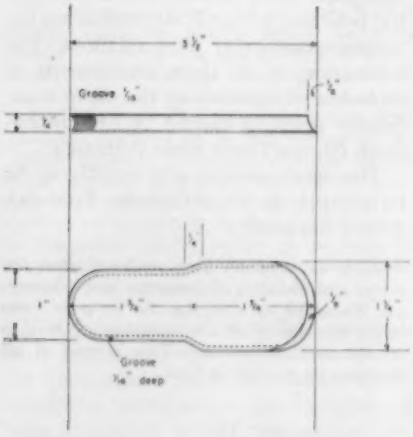
The appliance is 3½ inches long, ¼ inch thick, 1¼ inches wide at one end and 1 inch wide at the other. It has a groove 1/16 inch deep around the edge except at the large end where the groove is replaced by a ⅛ inch flange on one side.

The different widths of the two halves of the retainer offer sufficient variation in size so that it is usable in the mouths of most children.

Immediately after the application of the fluoride solution, the retainer is placed in position with the grooves on the two edges engaging the upper and lower buccal cotton rolls. The retainer is inserted far enough to support the buccal roll distally to the last upper tooth but not far enough to cause discomfort.

If the large end of the retainer is used, the flanged side is placed next to the teeth. The grooves on the edges prevent the cotton rolls from slipping while the flange protects the molar teeth from contact with the continuous buccal roll.

After the retainer is in position, the child is instructed to close his mouth sufficiently to hold it in place. The retainer, by preventing any contact between the cotton rolls and the teeth, eliminates the possibility of absorption of the solution by the cotton rolls.



Plastic retainer used to maintain position of upper rolls of cotton in posterior portion of mouth

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†Senior dentist, New York City Health Department, New York.

JUDICIAL COUNCIL

Ethics

The Judicial Council of the American Dental Association here reports an opinion regarding the ethical announcement of a change of address. Names have been removed, as well as other parts of the inquiry which would identify persons associated with the case. The question raised in this letter is covered by the *Principles of Ethics* of the American Dental Association, copies of which may be secured by writing to the Central Office of the Association.

NOTICE OF CHANGE OF ADDRESS

Question • I have been in the same offices for 21 years and now I am planning to move to my own apartment building.

When I move I want to carry a picture of my apartment building and appropriate wording on the recall notices and also on the removal notices which I plan to mail to all the patients listed in my files. I believe this might be an attractive as well as an unusual method of fixing my new location in the minds of my patients. Before doing so, however, I would appreciate your advice. Will this be ethical?

As to the notice itself, I would like to use one which I tore from a magazine years ago. It especially appealed to me as being strictly ethical and still unusual.

I would like to use this same removal notice with the exception that I would use the picture of my apartment instead of the picture of the house. My present office is on the eleventh floor and my new office would be on the first floor. That is why I think this would be very appropriate.

Can I use this removal notice with apartment picture and appropriate wording?

D.D.S.

COMING DOWN TO EARTH
We used to work where we don't no more,
We've moved where we never was before;
You know where we was, but not where we is,
So here's the new number as follows and viz:
WHYS:
No Elevator
No Stairs to Climb
Easier Parking
More Efficient Arrangement

Reply • It is the opinion of the Judicial Council that what you propose to do could not be considered unethical under the articles of the *Principles of Ethics* of the American Dental Association, but we do question the dignity or propriety of using the notices and cuts in the manner suggested.

It would appear to us that by using the cuts and wording that you have submitted you are not only sending out to your patients a notice of your office removal, but at the same time and on the same notice you are calling their attention to your "Blank Court Apartments—the best, prettiest and most convenient apartment in the city." We do not feel this is good professional procedure.

You could use the picture of the apartments, their name and address, but omit the extra wording.

Where you call attention to the change in location of your offices, we see no need for all the extra information.

Neither do we feel that it is unethical to send to your patients of record a cut of your office with the verses underneath as you suggest. Evidently you are a person with a very good sense of humor and have cultivated this same trait in your patients, or you wouldn't suggest this unique notice.

Please rest assured that the Council does not question your ethics or your motives. We do feel, however, that it would not be in keeping with the high ideals of your practice if you were to send out notices to your patients that not only call attention to your change of office address but to the good qualities of your apartments.

Judicial Council

BUREAU OF LIBRARY AND INDEXING SERVICE

Additions to the Library

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books. Most of the books also may be purchased through the Library.

BOOKS

AMERICAN ASSOCIATION OF DENTAL EDITORS. A manual for dental editors. 2d ed. American Association of Dental Editors, 1953. 48 p. $1.50.

AMERICAN DENTAL ASSOCIATION. American dental directory, 1954. Chicago, The Association, 1953. 1,078 p. $7.50.

AMERICAN DENTAL ASSOCIATION. COUNCIL ON DENTAL THERAPEUTICS. Accepted dental remedies. 19th ed. Chicago, The Association, 1953. 207 p. $2.00.

AMERICAN DENTAL ASSOCIATION. Index to dental literature, January-September, 1953. Chicago, The Association, 1953. 169 p.

ASSOCIATION OF AMERICAN MEDICAL COLLEGES. Films in psychiatry, psychology and mental health. New York, Health Education Council, 1953. 269 p. $5.00.

BECKS, HERMANN. Atlas of the skeletal development of the rat (Long-Evans strains). 2 volumes. San Francisco, American Institute of Dental Medicine, 1953. $48.00.

BEUBE, F. E. Periodontology; diagnosis and treatment. New York, Macmillan, 1953. 752 p. $15.00.

BOYD, WILLIAM. A text-book of pathology; an introduction to medicine. 6th ed. Philadelphia, Lea & Febiger, 1953. 1,024 p. $12.50.

BREGSTEIN, S. J. The successful practice of dentistry. New York, Prentice-Hall, 1953. 400 p. $5.35.

CHILTON, N. W. Analysis in dental research; experimental design and analysis of data. Washington, Office of Technical Services, U.S. Department of Commerce, 1953. 218 p. $3.00.

CHOKSEY, K. M. Dentistry in ancient India. Bombay, Popular Book Depot, 1953. 87 p. $1.50.

CONWAY, HERBERT. Plastic surgery at the New York Hospital one hundred years ago. New York, P. B. Hoeber, 1953. 110 p. $5.00.

COPE, V. Z. What the general practitioner ought to know about human actinomycosis. London, William Heinemann, 1952. 80 p. $2.50.

FENN, H. R. B.; LIDDELOW, K. P. & GIMSON, A. P. Clinical dental prosthetics. London, Staples, 1953. 502 p. $8.16.

FISH, E. W. Parodontal disease; a manual of treatment and atlas of pathology. 2d ed. London, Eyre & Spottiswoode, 1952. 252 p. $6.75.

FRIANT, M. Anatomie comparée cranio-faciale et dentaire. Paris, Julien Prélat, 1953. 114 p. $6.50.

GARN, S. M. Dental statistics; an introductory guide. Boston, Forsyth Dental Infirmary for Children, 1951. 54 p. $0.80.

GIBSON, H. L. The photography of patients; including discussions of basic photographic and optical principles. Springfield, Ill., Thomas, 1952. 118 p. $5.50.

GOLDMAN, H. M. Periodontia; a study of the histology, physiology and pathology of the periodontium and the treatment of its diseases. 3d ed. St. Louis, Mosby, 1953. 790 p. $16.00.

GOODMAN, N. M. International health organizations and their work. Philadelphia, Blakiston, 1952. 327 p. $6.50.

GREAT BRITAIN. MINISTRY OF HEALTH. Fluoridation of domestic water supplies in North America as a means of controlling dental caries. London, H. M. Stationery Office, 1953. 101 p.

HAMMOND, K. R. & ALLEN, J. M. Writing clinical reports. New York, Prentice-Hall, 1953. 235 p. $4.00.

HARROW, BENJAMIN. Textbook of biochemistry. Philadelphia, Saunders, 1950. 609 p. $6.50.

HEMLEY, SAMUEL. Orthodontic theory and practice. 2d ed. New York, Grune & Stratton, 1953. 591 p. $14.50.

HOGEBOOM, F. E. Practical pedodontia, or juvenile operative dentistry. Special chapters by Forrest Anderson and others. 6th ed. St. Louis, Mosby, 1953. 542 p. $12.50.

HURXTHAL, L. M. & MUSULIN, N. Clinical endocrinology. Philadelphia, Lippincott, 1953. 2 vol. 1,599 p. $24.00.

LANDA, J. S. and six contributors. The dynamics of psychosomatic dentistry. Brooklyn, Dental Items of Interest, 1953. 433 p. $6.75.

LEVY, I. R. A text-book for dental assistants. 3d ed. rev. Philadelphia, Lea & Febiger, 1953. 272 p. $4.00.

MENG, HEINRICH. Psychologie in der zahnärztlichen Praxis. Bern, Verlag Hans Huber, 1952. 178 p.

MICHIGAN, UNIVERSITY OF. Report writing in dentistry; a teaching outline. Ann Arbor, Overbeck, 1953. 31 p. $1.00.

MONICA, W. S. Woodie and the jolly dentist. New York, Pageant Press, 1953. 20 p. $1.50.

MONTGOMERY, G. L. Pathology for students of dentistry. Edinburgh, E. & S. Livingstone, 1953. 305 p. $5.44.

MUZY, EDMOND. La therapeutique orthopédique fonctionnelle de la face. Paris, Julien Prélat, 1952. 159 p. $6.50.

NOYES, F. B. Oral histology and embryology. 7th ed., edited and rev. by Isaac Schour. Philadelphia, Lea & Febiger, 1953. 448 p. $8.00.

ORBAN, BALINT. Oral histology and embryology. 3d ed. St. Louis, Mosby, 1953. 364 p. $8.50.

OSTLERE, GORDON. Trichlorethylene anaesthesia. Edinburgh, E. & S. Livingstone, 1953. 83 p. $2.25.

RUSK, H. A. Living with a disability. New York, Blakiston, 1953. 207 p. $3.50.

SAIZAR, PEDRO. Prótesis a placa. 5th ed. Buenos Aires, Progrental, 1953. 1,061 p.

SCHWARTZ, J. R. Inlays and abutments: their preparation and construction for dental restorations. Brooklyn, Dental Items of Interest, c1952. 478 p.

SCHWARZROCK, L. H. Training manual for the dental chair assistants. Minneapolis, Loren Press, 1953. 124 p. $4.85.

SUTHERLAND, S. S. When you preside. Danville, Ill., Interstate Printers and Publishers, 1952. 158 p. $2.50.

SWENSON, M. G. Complete dentures. 3d ed. St. Louis, Mosby, 1953. 735 p. $13.50.

TATTERSALL, W. R. & BARRY, H. D. The dentist's handbook on law and ethics. London, Eyre & Spottiswoode, 1953. 328 p. $3.95.

TYDINGS, K. S. A guide to medical and dental photography. New York, Greenberg, 1953. 124 p. $1.95.

U.S. ARMY. Physiologic effects of wounds. Washington, D. C., Department of the Army, 1952. 376 p. $3.50.

U.S. PRESIDENT'S COMMISSION ON THE HEALTH NEEDS OF THE NATION. Building America's health. Washington, D. C., National Health Council, 1952.

U.S. PUBLIC HEALTH SERVICE. Basic drugs; U.S. Public Health Service hospitals and clinics. Washington, D. C., Govt. Print. Off. 165 p. $0.50.

WELCH, HENRY. Antibiotic therapy. New York, Medical Encyclopedia, 1953. 562 p.

WILLIS, R. A. Teratomas. (Atlas of tumor pathology. Section III. Fascicle 9). Washington, D. C., Armed Forces Institute of Pathology, 1951. 58 p. $0.80.

WILSON, C. C. School health services. Washington, D. C., National Education Association and American Medical Association, 1953. 486 p. $5.00.

WINTER, LEO & HARRIGAN, W. F. A textbook of exodontia. Exodontia, oral surgery and anesthesia. 6th ed. St. Louis, Mosby, 1953. 350 p. $8.00.

The American Dental Association Film Library

A review of the Transactions and Reports of Officers of the American Dental Association indicates that the Association, more than a quarter of a century ago, recognized and appreciated the importance of audio-visual material for professional and nonprofessional use. In 1924 the Committee on Dental Health Education initiated the Association's audio-visual program by acquiring and making available on a loan basis a few copies of the two, and only, dental health educational films available at that time. During the next five years the Committee, working with the Bureau of Dental Health Education, expanded all of its activities including its audio-visual services. In 1929 the name of the Bureau of Dental Health Education was changed to the Bureau of Public Relations and its responsibilities in the field of lay education further expanded. During that year ten new films were added to the film loan library. During the thirties and the early forties, as new acceptable dental health films were developed, prints were added to the Association's stock. Not until 1942 was any serious effort made to develop a library of technical films. During that year the Association, in cooperation with the United States Department of State, made Spanish and Portuguese translations of 11 dental technical films. Copies of these films were made available by the State Department to universities and libraries in Latin American countries. Three years later, in 1945, the Association and the Department of State cooperated in a second film project which consisted of duplicating 11 additional dental technical films, in English only, for distribution to universities and libraries in European countries. Prints, in English, of the 11 films duplicated in the first project were also made available to European educators.

In the early forties, a series of 13 fifteen-minute radio transcriptions for children, each of which contained a dental health message, was produced by the Association. Subsequently other radio transcriptions were added to stock. Early in 1947 the administration of the Association's audio-visual materials was transferred to the Council on Dental Health. Additional prints of dental health education films were added to stock, and some new 2 by 2 slides and filmstrip lectures were developed.

In January 1952 the Film Library was

established by the Board of Trustees as a section of the Bureau of Library and Indexing Service, and provisions were made to engage an audio-visual specialist and secretarial assistance and to equip the new section with the necessary operating facilities. During the next two years, that is, by January 1954, the Film Library increased its film collection more than 300 per cent. The Library now has 360 prints of 95 different motion picture films as compared to 108 prints of 32 different films in 1952. Seventy-six of the present films are on technical subjects and 19 are on dental health as compared with 22 technical films and 12 dental health films in 1952. Because of the large number of requests received from dental societies, dental schools and other professional groups, more technical films than health educational films have been added to stock during the past two years. The Film Library now has films on periodontics, operative dentistry, prosthetics, oral surgery, oral pathology, orthodontics, temporomandibular disturbances, implant technics and anesthesia.

A film brochure which will include all the pertinent information on the films in stock plus reprints of film reviews that have been published in THE JOURNAL soon will be available.

The following 16 mm. films have been added to the Film Library and are now available for circulation at a rental fee of $2.50. Reviews of these films will appear in subsequent issues of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

DENTAL HEALTH

Taro's Adventure in Health • Color, sound, 20 min. Produced in 1953 for the Southern California State Dental Association by Cascade Pictures, Los Angeles, Calif. Purchase from the Southern California State Dental Association, 903 Crenshaw Boulevard, Los Angeles 19, Calif.

Taro attempts to teach children the precepts of good general health as well as good dental health by arousing their interest with an adventure story. (Accompanied by a teacher's guide. Suitable to a dental health program for children from 8 to 12.)

The Child and His Thumb • Color, sound, 18 min. (Shortened version, 11 min., also available.) Produced in 1952 by J. H. Sillman, D.D.S., New York.

Procurable on loan or purchase from Outlook Productions, Inc., 25 Broad St., New York.

This film summarizes years of research on the problem of thumbsucking and integrates the orthodontic, pediatric, and psychological viewpoints of the problem. (For parents and professional groups.)

TECHNICAL

Oral Cancer: The Problem of Early Diagnosis • Color, sound, 820 ft., 22 min. Produced in 1953 by the American Cancer Society and the National Cancer Institute. Procurable on loan or purchase from the American Cancer Society, Inc., 47 Beaver St., New York.

This film opens with a statistical sequence showing the curability rate of oral cancer. This is followed by illustrations, clinical cases and methods of biopsy technics. (Teaching film for physicians, dentists, medical and dental students.)

A Method of Mixing Silicate Cement • Color, sound, 400 ft., 10 min. Produced in 1953 by the National Bureau of Standards in cooperation with the American Dental Association. Procurable on loan or purchase from the National Bureau of Standards, Washington, D. C.

This film demonstrates a new method of mixing silicate cement in a closed container whereby the maximum amount of powder is incorporated into a given quantity of liquid independent of atmospheric conditions. (For dental students, hospital dental staffs, general practitioners and prosthodontists.)

Oral Rehabilitation • Color, magnetic sound, 1,600 ft., 35 min. Produced in 1953 by Clifton O. Dummett, D.D.S., Chief, Dental Service of Veterans Administration Hospital, Tuskegee, Ala., in cooperation with the Veterans Administration Hospital, Tuskegee, Ala.

This film depicts the surgical treatment of gingival hyperplasia in a patient who has developed the lesion as a result of the administration of diphenylhydantoin sodium for the control of epilepsy. (For dental students, hospital dental staffs, general practitioners and periodontists.)

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

The 1953 survey of dental practice
III. Income of dentists by type of practice, personnel employed, equipment owned and other factors

Specialists as a group reported mean net incomes approximately 28 per cent higher than general practitioners (Table 10). Among independent dentists, the mean for specialists was 39 per cent higher than the mean for general practitioners. The mean for salaried specialists was 25 per cent higher than the mean for salaried general practitioners.

Orthodontists reported the highest incomes, and oral surgeons were second. Among nonsalaried (independent) dentists, the difference between mean incomes in these two specialties was very small and could be accounted for by sampling error. Oral surgeons reported a higher gross income, but orthodontists, with lower expenses, reported a slightly higher net income. More of the oral surgeons were salaried, bringing down the mean net income of oral surgeons in the "all dentists" category.

Of the other three specialties for which enough returns were received to allow presentation of averages, all had incomes higher than those of general practitioners, although the advantage in the case of periodontists and prosthodontists was slight. The small number of returns from these specialties makes these figures subject to a rather large sampling error. The "other specialist" designation in Table 10 includes oral pathologists and public health dentists as well as specialties not recognized by the American Dental Association. A large proportion of this group were in salaried practice, which is reflected in the comparatively low incomes reported.

One out of every 11 respondents indicated he was a specialist. About one-third of the specialists were orthodontists and between one-fourth and one-fifth were oral surgeons. Thus, oral surgeons and orthodontists comprised more than one-half of all specialists participating in the survey.

Table 11 shows how the income and overhead of independent dentists varied according to number of chairs and number of employees of specified type. Although the dentist with only one chair and no employees had a low expense ratio, he also had the lowest net income. In general, net income rises as the number of employees and chairs increases.

It appears from Table 11 that the chairside assistant contributes more to the income of the dentist than does the secretary or receptionist. One-chair dentists averaged $10,357 with one assistant as compared to $9,419 with one secretary or receptionist. Two-chair dentists averaged $11,679 with one assistant as compared to $10,950 with one secretary or receptionist. Two-chair dentists averaged $15,665 with two assistants, as compared to $13,869 with one assistant and one secretary or receptionist.

Many more combinations of number and type of employees were reported

The first and second articles of this series appeared in The Journal, December 1953, p. 685, and January 1954, p. 68.

than those included in Table 11. Combinations not listed were reported by too few dentists to yield reliable statistics.

Table 12 shows how income varied according to number of employees without regard to number of chairs. Dentists who employed other dentists were excluded from this table so that the effect of employment of the usual types of auxiliary personnel could be shown. Although expenses comprise an increasing percentage of gross income as number of employees increases, the net income also increases because of the sharp rise in gross income. The gross income of dentists with no employees was only $10,791 compared to $36,999 for dentists with three (2.5 to 3.4) employees and $54,103 for dentists with more than three (3.5 and more) employees.

Table 13 shows how income varied according to the number of dental chairs used without regard to the number of employees. Dentists using three chairs reported net incomes nearly twice as high as dentists with only one chair. Almost 9 out of 10 dentists reported having either one or two chairs, with the two-chair office being slightly more common than the one-chair office.

It would be erroneous to conclude from Tables 11, 12 and 13 that any dentist can automatically increase his income by hiring additional employees or by increasing the number of chairs in his office. There must be sufficient demand or potential demand for dental services in the dentist's particular location to warrant office expansion. If the demand for dental services exceeds the capacity of a given dentist and his employees, there is little doubt that the dentist can increase his net income by increasing the number of chairs and auxiliary personnel.

Only 6.3 per cent of the independent dentists responding did not have x-ray equipment in their offices, and the mean net income of this group was about 17

Table 10 • Average income of dentists by type of practice, 1952

Type of practice	All dentists						Independent dentists				Salaried dentists	
	Per cent of respondents	Mean net income	Median net income	Standard deviation	Coefficient of variation	Standard error of the mean	Mean net income	Median net income	Mean gross income	Net as % of gross	Mean net income	Median net income
General practitioner	90.9	$10,293	$ 9,380	$6,291	61.1	$101	$10,582	$ 9,790	$18,295	57.8	$6,342	$5,957
Specialist	9.1	13,138	11,450	8,390	63.9	427	14,743	13,900	25,406	58.0	7,936	7,850
Oral surgeon	2.0	13,162	11,250	8,291	63.0	899	15,727	13,450	28,396	55.4	*	*
Orthodontist	3.2	15,728	15,200	9,756	62.0	837	16,069	15,550	25,746	62.4	*	*
Pedodontist	1.0	12,802	12,400	6,749	52.7	707	*	*	*	*	*	*
Periodontist	.7	10,355	10,700	5,684	54.9	1,074	*	*	*	*	*	*
Prosthodontist	.9	10,959	9,675	7,552	68.9	1,257	*	*	*	*	*	*
Other specialist	1.3	9,780	8,975	4,246	43.4	633	*	*	*	*	8,697	8,800
All types of practice	100.0	10,539	9,502	6,550	62.2	99	10,873	9,941	18,797	57.8	6,920	6,525

*Too few replies for reliable statistics.

Table 11 • Mean income of independent dentists, with specified number of chairs and number and type of employees, 1952

No. of chairs and no. and type of employees*	Mean net income	Mean gross income	Net as % of gross
1 chair, no employees	$ 6,558	$10,098	64.9
1 chair, 1 secretary or receptionist	9,419	15,492	60.8
1 chair, 1 assistant	10,357	17,010	60.9
2 chairs, no employees	8,210	12,492	65.7
2 chairs, 1 secretary or receptionist	10,950	18,820	58.2
2 chairs, 1 assistant	11,679	19,952	58.5
2 chairs, 1 assistant and 1 secretary or receptionist	13,869	25,466	54.5
2 chairs, 2 assistants	15,665	27,517	56.9
2 chairs, 1 technician and 1 or 2 of the following: assistants, secretaries and receptionists	14,736	26,810	55.0
2 chairs, 1 hygienist and 1 or 2 of the following: assistants, secretaries and receptionists	15,969	29,913	53.4
3 chairs, 1 assistant	13,140	22,836	57.5
3 chairs, 2 of the following: assistants, secretaries and receptionists	16,811	30,219	55.6
3 chairs, 1 hygienist and 1 or 2 of the following: assistants, secretaries and receptionists	17,769	33,741	52.7
4 chairs, 1 or more employees other than dentists	17,944	34,915	51.4
4 chairs, 1 dentist and 1 or more other employees	21,053	48,621	43.3

*In this table one employee actually means between .5 and 1.4 employees, and two employees means between 1.5 and 2.4 employees. (Part-time employees and employees who did not work the full year were counted as fractions.)

per cent lower than the income of dentists who had x-ray equipment (Table 14). Had it been possible to exclude from this table dentists in large professional buildings who utilize a central x-ray laboratory, the difference between these two averages undoubtedly would have been larger.

Table 12 • Mean income of independent dentists by number of auxiliary employees, 1952*

No. of employees†	Mean net income	Mean gross income	Net as % of gross
0	$ 7,007	$10,791	64.9
.1 - .4	7,442	12,446	59.8
.5 - 1.4	11,135	18,856	59.1
1.5 - 2.4	15,115	27,783	54.4
2.5 - 3.4	18,717	36,999	50.6
3.5 and more	24,798	54,103	45.8
All independent dentists	10,873	18,797	57.8

*Dentists who employed dentists were excluded from this table.

†Part-time employees and employees who did not work the full year were counted as fractions.

Equipment for administering gas was owned by 16.4 per cent of the respondents. Dentists without gas equipment reported mean net incomes about 13 per cent lower than dentists with such equipment (Table 15).

As shown in Table 16, dentists whose usual length of patient appointments was 30 minutes were more numerous and reported higher incomes than dentists with other appointment periods. Incomes tended to decrease as length of patient appointments increased. In this correla-

Table 13 • Average net income of independent dentists by number of dental chairs used, 1952

No. of chairs	Per cent of dentists	Mean net income	Median net income
1	41.9	$ 8,300	$ 7,459
2	46.7	11,846	11,039
3	8.6	15,310	14,050
4 or more	2.8	20,212	17,983
All independent dentists	100.0	10,873	9,961

Table 15 • Average net income of independent dentists according to whether dentist had equipment for administering gas, 1952

Gas equipment	Per cent of dentists	Mean net income	Median net income
Yes	16.4	$12,183	$10,650
No	83.6	10,595	9,835
All independent dentists	100.0	10,873	9,961

tion there may well be a third factor involved. It seems possible that dentists who are not busy tend to schedule longer appointments. Thus, both longer appointments and lower incomes may result from a third factor: a relatively small number of patients. ("Other" in Table 16 includes dentists who checked more than one length-of-appointment category. The "30 minutes" category includes a few dentists who reported appointments of 15 or 20 minutes.)

Dentists who worked 47 weeks during 1952 reported higher incomes than dentists who worked more or fewer weeks (Table 17). Independent dentists who worked 47 weeks reported a mean net income of $12,430; income was lower with each additional week worked, and dentists who worked all 52 weeks had a mean net income of $9,429.

At first glance the correlation of income with number of weeks worked may appear incongruous. However, the dentist with relatively high income is thereby able to take a longer vacation than the dentist with a lower income. A vacation usually involves two types of costs for a dentist in private practice: (1) the loss of revenue from dental practice and (2) the cost of travel and entertainment that usually accompanies a vacation. Thus, it is understandable that the high income dentist would tend to take a longer vacation than the low income dentist.

The mean net income for dentists who worked 40 weeks or more was $10,859 for all dentists, $11,101 for independent dentists, and $7,899 for salaried dentists.

More dentists reported working 50 weeks (21.7 per cent) than any other number of weeks, followed closely by the percentage of dentists who worked 48 weeks (20.8 per cent). Most of the weeks not worked were spent on vacation, although some of this time is accounted for by illness, other types of work, and, in the case of recent graduates, the period prior to establishment of the practice. All types of dental work were included in the count of weeks worked.

Table 14 • Average net income of independent dentists according to whether dentist had x-ray equipment, 1952

X-ray equipment	Per cent of dentists	Mean net income	Median net income
Yes	93.7	$10,986	$10,003
No	6.3	9,126	6,600
All independent dentists	100.0	10,873	9,961

Table 16 • Average net income of independent dentists by usual length of patient appointments, 1952

Usual length of patient appointments	Per cent of dentists	Mean net income	Median net income
30 minutes	44.5	$11,749	$10,625
45 minutes	22.8	10,366	9,525
1 hour	26.7	9,618	8,614
1½ or 2 hours	3.1	9,115	8,250
Other	2.9	12,603	12,000
All independent dentists	100.0	10,873	9,961

Table 17 • Average net income of dentists by number of weeks spent in all types of dental work, 1952

No. of weeks	All dentists			Independent dentists		Salaried dentists	
	Per cent of respondents	Mean net income	Median net income	Mean net income	Median net income	Mean net income	Median net income
52	5.6	$ 9,333	$ 7,700	$ 9,429	$ 7,971	$	$
51	4.1	10,028	8,188	10,015	8,300	7,575	7,160
50	21.7	10,546	9,188	10,782	9,625		
49	12.3	11,220	10,032	11,470	10,350		
48	20.8	11,370	10,138	11,754	10,725	7,900	7,300
47	6.4	12,243	11,650	12,430	11,960		
46	7.7	11,429	10,550	11,684	10,930		
45	4.8	10,720	9,800	10,754	9,850		
44	3.9	10,866	9,700	10,957	9,958		
43	.8	*	*	*	*	8,440	7,400
42	2.3	10,350	8,750	10,425	9,350		
41	.3	*	*	*	*		
40	3.5	8,795	7,867	8,765	7,300		
Less than 40	5.8	5,709	3,767	6,432	4,500	3,331	2,700
All dentists	100.0	10,539	9,502	10,873	9,961	6,920	6,525

*Too few replies for reliable statistics.

Table 18 • Average net income of independent dentists according to description of practice, 1952

Description of practice	Per cent of dentists	Mean net income	Median net income
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	20.9	$13,040	$12,125
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked.	18.8	12,415	11,194
There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care.	44.9	10,790	9,829
You did not have as many patients as you would have liked.	15.4	6,577	5,953
All independent dentists	100.0	10,873	9,961

Independent dentists were asked to indicate how busy they were in 1952 by checking one of the four statements listed in Table 18. The statement checked by more dentists than any other was to the effect that a good balance existed between demand for dental services and the dentist's ability to meet that demand.

Almost as many dentists, however, checked one of the two statements which indicated the dentist was "too busy" (that is, was unable to meet the demand, or, in meeting the demand, felt he was required to work too hard). A total of 15.4 per cent of the respondents indicated their practices were not as busy as they would have liked in 1952. The mean net income of this group of dentists was only $6,577 compared to $13,040 for dentists who were so busy they had to turn away patients.

This analysis will be continued in subsequent issues of THE JOURNAL.

B. Duane Moen, Director

COUNCIL ON DENTAL EDUCATION

Accreditation of dental laboratory technology programs

Recent action by the Council on Dental Education on the appraisal of programs for the training of dental laboratory technicians now brings the total number of accredited schools to four. The following are the four, with two-year programs in operation, that have been approved:

California	School for Dental Laboratory Technicians University Extension Dental Program University of California (L.A.) 815 South Hill St. Los Angeles 14	J. Eugene Ziegler Director
New York	Dental Laboratory Technology Course Institute of Applied Arts and Sciences State University of New York 300 Pearl St. Brooklyn 1	Herman Wald Supervisor
Ohio	Division of Dental Laboratory Technology College of Dentistry Ohio State University Columbus 10	Carl O. Boucher Director
Tennessee	Division of Dental Technology School of Dentistry Meharry Medical College Nashville 8	William H. Allen Director of division and dean, School of Dentistry

Approval of additional hospital educational programs

The following educational programs in hospitals were recently approved by the Council on Dental Education:

Hospital	Type of program	
	Internship	Residency
Millard Fillmore Hospital 875 Lafayette Ave. Buffalo 9, N. Y. G. G. Pritchard, D.D.S. Chief of Dental Staff	Straight Oral surgery	Oral surgery (2 years)
Cincinnati General Hospital 3231 Burnet Ave. Cincinnati 29, Ohio Robert M. Schell, D.D.S. Chief of Dental Staff	Straight Oral surgery	Oral surgery
Pennsylvania Hospital Eighth and Spruce Sts. Philadelphia 7, Pa. James R. Cameron, D.D.S. Chief of Dental Staff		Oral surgery (2 years)

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Editorials

When researchers disagree the public best be cautious

The Federal Trade Commission, whose responsibilities include cracking down on false and misleading advertising, is reported to be investigating the miracle claims currently being made by the merchants of certain dentifrices—more specifically by the purveyors of the new antienzyme dentifrices which are purported to give lifetime protection against tooth decay.

It is gratifying to learn that the Federal Trade Commission is concerning itself with these latest entries into the manufacturers' race to exploit the prevention of dental decay. It must be recognized, however, that the machinery of the F.T.C., like the proverbial mill, "grinds slowly"—so slowly, in fact, that the promoters of the dentifrices in question will have time to get in and out of the market profitably before time and clinical tests determine the worth of their product.

Six months have elapsed since announcements of the antienzyme dentifrice theory broke simultaneously on an unsuspecting public and a skeptical profession. Since then there has been a growing conviction that the results and conclusions reported by Fosdick[1] were somewhat premature and that further clinical research and public trial may demonstrate a considerably reduced effectiveness of the antienzyme dentifrices.

The researches of Forscher and Hess published elsewhere in this issue of THE JOURNAL point toward such an eventuality. Investigators of the Federal Trade Commission, members of the dental profession and others concerned with public health

will read with interest the Forscher-Hess report, as those researchers apparently have been unable to obtain results comparable to those reported by Fosdick and his associates. Forscher and Hess doubtless are not alone in their efforts to test the findings and inferences of Fosdick. Other researchers should be well along in their investigations of his intriguing theory, and their reports soon recorded in the literature. Whether their ultimate findings will substantiate or negate the original antienzyme dentifrice theory, it is too early to state. It is not too early, however, to surmise that with nothing more to go on than the limited clinical evidence available to date, the anticariogenic miracle promised for the antienzyme dentifrices may well turn out to be not a miracle but a mirage—which, according to Webster, is "an optical phenomenon produced by a stratum of hot air. . . ."

Until such time as scientific research has converted mirage into miracle, the public and the profession can well be guided by conclusions voiced at the Symposium on Therapeutic Dentifrices presented at the annual session of the Association last September. One pronouncement was to the effect that as yet there is no evidence that dentifrices as used by the public materially decrease the dental caries rate because of any specific therapeutic substance incorporated in them. The other conclusion was that advertising claims for dentifrices lead the public mistakenly to rely on some incorporated ingredient rather than on the prophylactic value of the toothbrush.

1. Fosdick, L. S., and others. New approach to the problem of dental caries control. J. D. Res. 32:486 August 1953.

America's mounting population a challenge to the dental profession

Whatever else may happen to the United States in the foreseeable future, its population will continue to expand—a matter of importance to the dentist.

This year the country's population reached a high of one hundred and sixty-one million, twenty-nine million more than in 1940 and thirty-eight million more than in 1930. Just to show how greatly experts can err, officials in the mid-thirties predicted that the country's population probably would never exceed one hundred and sixty million—a figure passed in less than twenty years. Two hundred and six million Americans are in sight for 1975—only one generation in the future.

Naturally the greatest population growth is in the infant bracket. The number of children born each year since 1947 has broken all previous records, resulting in expanding school enrollments with no end in sight. It is reported that enrollments in today's grade schools, high schools and colleges are twenty-six per cent higher than in 1946, and authorities predict another thirty per cent increase by 1960—six short years away.

This rise in population, which shows no signs of ceasing, means expanding needs in all walks of life—in business, in agriculture, in mining and in manufacturing. It means expanding needs for homes and families—including dental needs.

For the past decade dental educational administrators have been hard pressed to expand their facilities and faculties to meet the growing demands for a professional dental education. Fortunately, the establishment of four dental schools during the past eight years plus the almost herculean efforts to expand accommodations of existing schools has enabled the profession to maintain some semblance of balance between dental demands and dental service. This they have done by raising the average number of dental graduates from less than 1,800 in the 1930's to about 3,000 annually—an increase since 1940 of some 1,200 per year.

Although the efforts of the educators cannot be praised too highly and the results of their efforts must not be underestimated, they dare not, at this time, rest on their oars. Efforts must be increased, plans must be expanded and perspective widened if dentistry is to meet the dental demands of an additional forty-five million people promised by 1975.

Whether advances in dental technics, improvements in preventive dental measures and the adoption of better dietary habits will play an effective part in reducing the incidence of dental disease during the next twenty years is problematical; but at best they will not completely solve the dental problem. Therefore, it would seem that during the foreseeable future the nation will have to depend on more dentists and their auxiliaries to keep the mouths of the American people in order. This means more and, if possible, better dental schools and more schools for dental auxiliaries.

The dental problems caused by America's population growth, however, are not altogether the concern of the educator—some must be shared and solved by the practicing dentist. With a birth rate of twenty-four per thousand of population per year and an ever-increasing appreciation of good dentistry, America is demanding and will continue to demand more and better dental care for its children—all of which spells out, in plain and simple language, that more dentists will have to devote more of their time and more of their talents to pedodontics.

Solution of the Piltdown mystery: scientists erase Dawn Man

The recent revelation[1] that the famous Piltdown mandible and teeth are in reality a fake amounts to the annihilation of a major discovery. In spite of the fact that there always have been scientists who refused to regard the fragments of skull, jaw, and teeth as the remains of a single most ancient fossil man, yet the textbooks of anthropology have generally accepted that hypothesis. The Dawn Man will now disappear from the schoolroom; and the face of paleontology may be a bit red for a time, but the skill with which the deception was perpetrated furnishes some excuse. At any rate, the outline of man's cranial and facial development through the ages has not been made more obscure by this upset, for the Piltdown remains have always been recognized as an anomalous combination contradicting the testimony of other fossil

specimens. The investigators have not declared how the hoax was brought about, but it appears that *Eoanthropus dawsoni*, the scientific name with which the remains were christened, indicates, with greater appropriateness than was intended, how much the specimen owes to its discoverer.

The excellent work of three outstanding British scientists revealing the true character of the Piltdown remains suggests numerous reflections on the pitfalls and necessary precautions of scientific investigation in general, which are equally applicable to dental science.

Obviously, no scientific theory can be better than the quality of the observed material, and no generalization can be justified unless the evidence is adequate in quantity. The hypothesis of an eoanthropic race lacks both quality and quantity of evidence. Paleontology is often particularly handicapped by this shortcoming since human and animal fossil remains are both fragmentary and scanty. A more certain and restricted history of the human race may be written if the suggestion of one American anthropologist[2] is generally adopted; namely, that only relatively complete specimens should be regarded as acceptable evidence, where extensive reconstruction is unnecessary. On this basis it would be necessary to consider the state of man's physical characters five hundred thousand years ago as not more than conjectural from presently known skeletal remains.

Periodic review and reconsideration of the evidence on every scientific problem in the light of recent tests and knowledge would be salutary routine. It was such a scrutiny of the Piltdown remains that led to their conclusive rejection as valid evidence. It is true that solely by the light of the logical application of knowledge already established, some anthropologists and comparative anatomists[3] many years ago were able to declare with conviction that the various fragments assembled as a unitary specimen of early man showed too many discrepancies to be considered as belonging to a single individual or species. But the application of lately devised and fundamental tests has determined with finality what logic could only show was plausible.

The means employed to reveal the true nature of the Piltdown specimens were microscopic and gross examination of the worn surfaces of the teeth, determination of the fluoride content, determination of the nitrogen content of the bone and tooth material, and examination of the coloring matter of the external surfaces of the specimens. Most of these methods did not exist until a few years ago, and none of them were applied forty years ago with the thoroughness employed today.

Finally, reversals of scientific opinion such as that in the Piltdown case emphasize the fact that the scientist must expect occasionally to have his world revolutionized, usually by the discovery of new truth rather than by the uncovering of old dishonesty. Prepared for such cataclysms by philosophical attitude, the true scientist will not become discouraged, lose faith in the scientific quest for truth, and renounce his calling. Rather, he will accept the setback and overthrow of established knowledge as preliminary to a new and closer approach to truth, offering possibly more significant implications and applications than did the older belief.

The Piltdown fiasco is a lesson for all scientists, and the researcher in the field of dental science cannot expect to be altogether exempt from the experience which the paleontologist has just now undergone in this related field.

1. Weiner, J. S.; Oakley, K. P., and Clark, W. E. LeGros. The solution of the Piltdown problem. Bul. British Museum (Natural History) 2:141 Nov. 21, 1953.

2. Washburn, Sherwood L. The Piltdown hoax. American Anthropologist 2:759 Dec. 1953.

3. Sicher, Harry. Zur Phylogenese des menschlichen Kiefergelenkes nebst Bemerkungen über den Schädelfund von Piltdown. Ztschr. f. Stomatologie 35:269, 1937.

Answers to some income tax questions

The following income tax questions, prepared from information provided by the American Institute of Accountants, are designed to inform dentists of some facts which may help them in filing their income tax forms. The questions and answers supplement the information contained in the informative article entitled "The Dentist's Income Tax Return," by W. S. McClanahan and Alban Weber, which was published in the January 1954 issue of THE JOURNAL.

QUESTIONS

1. Your wife did some work as a substitute teacher which brought in less than $600. She wants a refund of the tax withheld from her pay. You should:

a. Let her file a separate return to get her refund and file your return claiming exemptions for both of you.

b. Advise her to file a joint return with you.

c. Each file a separate return claiming one exemption.

2. You obtain three loans; the first to buy professional supplies, the second to make repairs for a tenant and the third to pay your son's college tuition. You can deduct:

a. The interest on the first loan.

b. The interest on the first and second loans.

c. The interest on all three loans.

3. You own several types of securities. Which of the following is taxable?

a. Stock dividend (in the form of common stock distributed to common stockholders).

b. Interest on state and municipal bonds.

c. Interest on bonds of a tax-exempt educational institution.

4. Your daughter worked for you part time as a dental assistant and earned $595. She filed a return to get a refund of tax withheld from her wages. You can:

a. Not take a deduction.

b. Deduct her wages as a professional expense and take a $600 exemption for her.

c. Deduct her wages as a professional expense, but not take the $600 exemption.

5. You gave your church a corner lot for which you had paid $500. Its value at the time of your gift was $1,500.

a. You must pay a capital gains tax on the $1,000 increase.

b. You may claim a deduction of $500.

c. You may claim a deduction of $1,500.

6. Which of these is not a requirement in claiming the $600 exemption for a dependent:

a. The dependent must be a close relative as defined in the tax instructions.

b. Must not have had $600 or more of income.

c. Must not be claimed as an exemption by his or her spouse.

d. Must be a citizen of the United States.

e. Must have received more than half his or her support from you.

7. You are a member of a partnership. Your partnership tax year:

a. May be a fiscal year ending the last day of any month.
b. Must be the same as your personal tax year.
c. Must be the calendar year.

8. You recently sold 25 shares of stock for a gain of $100. You had held these shares just under six months. You had no other "capital" transactions. Your tax on this transaction:
a. Is the same as for ordinary income.
b. Can not be more than the capital gains ceiling of 26 per cent.
c. Is based on 50 per cent of your capital gain.

9. You have made a gift of stock to one of your children. If the dividends from this stock amount to less than $600:
a. The dividends must be reported, but no tax is imposed.
b. They are taxed as a capital gain.
c. They do not deprive you of the dependency exemption for the child.

ANSWERS

1. b.—A joint return is best for husband and wife, except for unusual situations, including some involving medical expenses and capital losses. It's wise to figure the tax both ways before deciding. If your wife uses her exemption in a separate return, you are not allowed to claim it in yours.

2. c.—The interest on the first and second loans can be deducted as professional expense. The interest on the third loan is a personal deduction, unless you use the standard deduction.

3. c.—Certain types of organizations, such as religious and educational associations, are not required to pay tax, but you still must pay tax on interest received from their bonds.

4. b.—The wages are deductible if they are reasonable. The exemption is not lost, if she qualifies in all other respects, until her gross income reaches $600.

5. c.—Your deduction for a charitable contribution is the value of the gift at the time it is made. You are not considered to have realized a taxable gain when you give away property that has increased in value.

6. d.—The dependent may be either a United States citizen or a resident of the United States, Canada or Mexico.

7. a.—You establish your fiscal year when you file your first return after organizing the partnership. You may change it only with government permission, requested at least 60 days before the proposed year-end date.

8. a.—But if you had held the stock beyond six months, you would have had a long-term instead of short-term capital gain. You would have been taxed on only 50 per cent of the gain, and in no case would the tax exceed 26 per cent of the gain.

9. c.—The dividends are income to the child, provided the gift is considered genuine, and no return is required from anyone having less than $600 gross income.

Washington News Letter

In January Congress got off to a flying start on the national health question. Through public hearings, statements and introduction of bills, Capitol Hill gave strong indications that it intends to give the subject serious attention in 1954.

President Eisenhower, also, by sending a special health message to Congress, demonstrated that he places national health in the forefront of domestic issues. Dental problems, however, receive practically no consideration, in spite of the great incidence of caries and other dental disabilities in the population.

THE PRESIDENT'S HEALTH MESSAGE

President Eisenhower's special health message to Congress January 18 was the opening gun of what is expected to be an all-out government campaign to achieve legislation of broad consequence.

Details of the proposed program were withheld in the message, but it is believed they will be spelled out gradually in coming weeks, particularly in Congressional bills introduced to implement the Chief Executive's recommendations. Generally speaking, the White House desires to strengthen and increase membership in voluntary prepayment programs; reorganize the system of grants-in-aid; expand construction of hospitals and nursing homes through federal assistance; stimulate rehabilitation of the physically handicapped and step up support of research in the health sciences.

Coinciding with transmittal of the message to Congress, Secretary of Health, Education and Welfare Oveta Culp Hobby conducted a briefing session for representatives of national health organizations. Representing the American Dental Association at the meeting was C. Willard Camalier, assistant secretary.

Administration proposals to liberalize the Social Security laws and extend coverage to ten million more citizens, including self-employed dentists, also were discussed at the briefing session. It was made clear by Secretary Hobby that President Eisenhower is insistent upon dentists and physicians being brought under Old Age and Survivors Insurance, notwithstanding the fact that their respective national societies are on record in opposition to compulsory coverage.

In his special message on health, President Eisenhower observed that progress in recent years "has been the result of many particular efforts, and of one general effort. The general effort is the partnership and teamwork of private physicians and dentists and of those engaged in public health . . . To all these dedicated people, America owes most of its recent progress toward better health."

Immediate reaction to the message's general proposals was generally favorable on Capitol Hill. But no members of Congress, Republican or Democratic, made any flat commitments. It is conceded that the real contest will start when public hearings are conducted by Congressional committees on the specific measures introduced at the behest of the White House.

To be taken up in these hearings will be such questions as the feasibility of including dental care benefits in the contracts of voluntary prepayment plans; dental aspects of physical rehabilitation, a subject that was emphasized in Mr. Eisenhower's message; reappraisal of federal policy dealing with government grants-in-aid for dental research and dental public health, and possibly the rate of utilization of hospital facilities for treatment of dental and maxillofacial disabilities.

In addition to these issues, of course, Congress will be busy considering such interrelated matters as proposed reform of veterans' medical and dental services, retrenchment of Public Health Service benefits for merchant seamen and the anticipated recommendation by the Department of Defense that the government establish a system of dental and medical scholarships for the ultimate purpose of bolstering those career corps in the Army, Navy and Air Force.

On January 11, the House Commerce Committee opened public hearings on voluntary prepayment insurance and union medical care plans. These were scheduled to continue through February 2. The committee's chairman, Rep. Charles A. Wolverton (R., N. J.), introduced four national health bills on the first day of the Congressional session. Three of them are designed to strengthen voluntary prepayment plans through federal reinsurance and loans. The fourth amends the income tax laws to permit deductibility of up to $100 a year on premium payments made to health plans.

On the Senate side, action on health measures was due to begin later in the month, following transmittal of the President's special message. The subcommittee on health legislation of the Senate Committee on Labor and Public Welfare has been reconstituted and now consists of the following: William A. Purtell

(R., Conn.), chairman; Barry Goldwater (R., Ariz.), John Sherman Cooper (R., Ky.), Lister Hill (D., Ala.) and Herbert H. Lehman (D.-L., N. Y.).

Also on the late-January calendar was disclosure of the budget for running the federal government in the year beginning July 1, as recommended by the President and subject to revision and enactment by Congress. Among the bulky document's thousands of items are allocations for federal aid to dental research and education, promotion of fluoridation, assistance to the states for dental public health projects, fee-basis dental care of veterans and operation of the National Dental Research Institute.

CURRENT DRAFT FIGURES

As of mid-January, Selective Service headquarters had still received no requisition for dentists from the Department of Defense despite a military shortage—particularly in the Navy—which some officials said was nearing the acute stage. Early in the month, Selective Service sent directives to its state directors requesting them to step up their efforts to have dentists who are regular and special registrants apply for commissions. The state draft officials also were directed to collect and submit detailed information on dental registrants who have not served in the Armed Forces.

The latest compilation by Selective Service headquarters gives a statistical picture as follows:

On December 1, 1953, there was a total of 40,829 on the registration list—4,005 in Priority I; 812 in Priority II; 15,108 in Priority III and 20,904 in Priority IV.

Classified in 1-A and physically acceptable for military duty were 245 Priority I men and 56 in Priority II. In Priority III, 4,533 were similarly available and acceptable.

Up to the date of the report, 13 dentists were recorded as having been inducted into the armed services, of whom eight were in Priority I, one in Priority II and four in Priority III.

Holding occupational deferments were 139 Priority I's, 54 Priority II's and 1,456 Priority III's. Deferred as 4-F's were 437 Priority I's, 131 Priority II's and 3,001 Priority III's.

Since they became registrants under the special draft, 2,691 Priority III dentists have reached their 51st birthday and been reclassified in 5-A, which places them beyond involuntary call-up. In the same category are two Priority I registrants and one in Priority II.

CONGRESSIONAL CALENDAR

Congressional leaders have expressed hope that adjournment will come no later than July 1, so that members can prepare for fall election campaigns. Doubt exists, however, as to whether the goal can be reached in view of the size of the work schedule.

Among the matters of particular interest to dentistry which await disposition are the following:

Establishment of military scholarships in dental and medical schools, desired by the Department of Defense.

Codification of federal statutes dealing with health services to dependents of military personnel.

Legislative proposals that would amend the tax laws to permit dentists, lawyers and other professional people to gain tax-deferment on a limited portion of their annual income to be set aside in voluntary retirement funds. (Tied in with this is the President's recommendation that Social Security coverage be extended to these same self-employed citizens.)

Possible reforms in the medical care of veterans, one large phase of which is the provision of outpatient dental services by private practitioners on a fee basis.

Possible amendment of the so-called doctor-draft law, though at this point it would seem that Congress will allow this statute to expire on schedule in June, 1955.

PRESIDENT EISENHOWER URGES OASI FOR DENTISTS, FEDERAL REINSURANCE FOR PRIVATE HEALTH INSURANCE

President Eisenhower's health and Social Security programs, outlined in messages to Congress in mid-January, are contained in bills introduced since that time. Hearings on these bills will be held during the next few months by Congressional committees. The Association opposes the inclusion of dentists in the Old Age and Survivors Insurance program and as yet has taken no stand on federal reinsurance.

PRESIDENT PROPOSES UNDERWRITING HEALTH PLANS

President Eisenhower offered Congress a five-point program on January 18, which he said would give Americans better health and longer life. The program calls for:

1. A federal corporation providing reinsurance of private health insurance programs, aimed at making it possible for these plans to extend their coverage and to protect against the cost of catastrophic illness. This corporation would be similar in some respects to the Federal Deposit Insurance Corporation for bank deposits.
2. Simplification of federal grants-in-aid to states to permit the states to exercise greater responsibility in health, child welfare and rehabilitation of the disabled.
3. Strengthening of the public health service research program, which would include grants to state and local governments and to private institutions.
4. Greater assistance to states for vocational rehabilitation of the disabled.
5. Expansion of nonprofit hospitals for the chronically ill. Assistance in the construction of nonprofit medically supervised nursing and convalescent homes. Help in the construction of nonprofit rehabilitation facilities for the disabled. Assistance in the construction of nonprofit diagnostic or treatment centers for ambulatory patients.

The President said his plan rejects "the socialization of medicine." The emphasis will remain on private care, he stated, but the government will provide assistance.

He pointed out that the nation's total private medical bill now exceeds 9 billion dollars annually. The bill, which is steadily rising, averages $200 a year for a family.

BILLS TO INCLUDE DENTISTS IN OASI PROGRAM INTRODUCED

The coverage of "self-employed professional persons" in the federal Social Security program was proposed by President Eisenhower January 14 in a special message to Congress which called for the expansion of the Social Security program.

Reiterating a plan which he first presented last summer, the President urged the inclusion of ten million Americans not presently covered by the Old Age and Survivors Insurance program.

Self-employed professional persons would include dentists, physicians, lawyers, architects, accountants and—on a voluntary basis—clergymen.

The President's proposals were included in bills submitted immediately after the President's message by Rep. Daniel A. Reed (R., N.Y.), chairman of the House Ways and Means Committee.

Among other provisions of Congressman Reed's bills are an increase in monthly benefits, an increase in the maximum salaries which beneficiaries may earn in addition to their monthly stipend, the elimination of the four lowest years of earnings in computing a worker's average monthly wage and the obtaining of benefits for totally disabled persons forced to retire before the age of 65.

Also, the tax base for Social Security purposes would be raised from $3,600 to $4,200. Persons earning $4,200 or more would pay $84 annually in Social Security payments, rather than the present total of $72.

Association Affairs

MEMBERSHIP REACHES 80,127 HIGHEST IN A.D.A. HISTORY

Membership in the American Dental Association reached an all-time high of 80,127 at the end of 1953. The new total is nearly 2,500 higher than the previous record of 77,722 set in 1952. Included in the total were 67,269 active members and 3,092 life members, both new highs. Student membership also increased.

ACCIDENT, HEALTH INSURANCE ENROLLMENT PERIOD OPENS

The second enrollment campaign for the Association's Group Accident and Health Insurance Plan opened February 1, with a total of 7,000 new applications being set as the national goal in order to qualify so-called impaired risks for coverage.

The Association plan insures the dentists against disability and inability to practice, as well as against accidental death or dismemberment. The dentist may insure himself for $100-$400 monthly benefits in the event of disability and for a $5,000-$20,000 benefit in case of dismemberment; the accidental death benefit is $3,000. Rates vary according to the age of the applicant (see page A-34).

In the charter enrollment period last year, about 7,000 applicants were accepted for insurance and about 3,000 failed to qualify as acceptable risks. "If 17,000 applications had been received, all applicants would have been accepted," announced Paul Zillmann of Buffalo, insurance trustee for the Association.

Association members who had their applications returned to them during the first enrollment period have been asked to send new applications to Dr. Zillmann, 29 Walden Avenue, Buffalo, N. Y. He will send them to the insurance company when a sufficient number of applications has been received to admit so-called impaired risks. The maximum coverage for dentists with some physical disability is $200 monthly, states Dr. Zillmann.

An additional age group, 65-70 years, has now been made eligible for participation in the plan.

SECRETARIES' CONFERENCE POSTPONED TO 1955

No meeting will be held during the current year of the State Secretaries' Management Conference, according to L. M. Cruttenden, assistant secretary of the Association. Instead, the conference will be held January 17-19, 1955.

The reasons for this postponement, stated Dr. Cruttenden, are that the annual session of the Association and dates already set for other meetings make it impossible to find a suitable time for the Conference.

RELIEF FUND REACHES 82% OF QUOTA JANUARY 14

Contributions to the Association's Relief Fund totaled $82,213.84, or 82% of the total goal of $100,000 as of January 14, announced the Council on Relief.

This was a jump of $11,616 above the previous month, and $7,500 more than the total achieved this time last year. Seven more societies went over quota to bring the total list of paid-in-full groups to 14. Last year at the mid-January mark, 7 societies had reached quota. Societies which have paid or overpaid their full quota are Alabama, Alaska, the District of Columbia, Hawaii, Idaho, Iowa, Louisiana, Montana, Nevada, North Dakota, Oklahoma, South Dakota, Tennessee and Washington.

As of January 14, $677 had been contributed by students, $16.25 by dentists in unorganized regions and associate members.

Contributions of constituent societies as of January 14 were as follows:

Quota over $900.00

	Quota	Contributions to January 14	Pct.
California	$ 3,740.00	$ 3,236.50	86.5
So. California	4,530.00	5,322.50	117.5
Colorado	920.00	714.00	77.6
Connecticut	1,930.00	1,595.12	82.6
Florida	1,270.00	1,195.00	94.1
Georgia	1,040.00	707.50	68.0
Illinois	7,370.00	6,501.75	88.2
Indiana	2,350.00	2,189.00	93.1
Iowa	1,860.00	2,053.80	110.4
Kansas	990.00	777.30	78.5
Kentucky	1,120.00	800.76	71.5
Louisiana	1,010.00	1,013.50	100.3
Maryland	1,060.00	917.00	86.5
Massachusetts	3,780.00	3,145.83	83.2
Michigan	4,010.00	3,817.65	95.2
Minnesota	2,940.00	2,438.50	82.9
Missouri	2,530.00	2,094.56	82.8
Nebraska	1,060.00	978.85	92.3
New Jersey	4,070.00	3,186.50	78.3
New York	15,210.00	8,520.86	56.0
N. Carolina	1,230.00	673.00	54.7
Ohio	4,980.00	3,777.05	75.8
Oregon	1,200.00	1,016.00	84.7
Pennsylvania	6,830.00	4,758.50	69.7
Tennessee	1,200.00	2,842.00	236.8
Texas	3,160.00	1,821.50	57.6
Virginia	1,130.00	989.50	87.6
Washington	1,780.00	1,809.50	101.7
Wisconsin	2,910.00	1,928.00	66.3
Total	$87,210.00	$70,821.53	81.2

Quota of $900.00 or less

	Quota	Contributions to January 14	Pct.
Air Force	$ 600.00	$ 396.00	66.0
Alabama	750.00	1,446.11	192.8
Alaska	50.00	152.00	304.0
Arizona	280.00	82.00	29.3
Arkansas	560.00	480.50	85.8
Army	630.00	289.00	45.9
Delaware	160.00	143.00	89.4
Dist. of Col.	850.00	1,301.00	153.1
Hawaii	360.00	403.00	111.9
Idaho	260.00	339.00	130.4
Maine	450.00	261.00	58.0
Mississippi	520.00	388.50	74.7
Montana	370.00	378.50	102.3
Navy	830.00	364.00	43.9
Nevada	90.00	118.50	131.7
N. Hampshire	290.00	248.00	85.5
New Mexico	250.00	247.50	99.0
North Dakota	340.00	458.05	134.7
Oklahoma	890.00	1,149.00	129.1
P. Canal Zone	20.00	.....	....
P. Health Serv.	260.00	99.50	38.3
Puerto Rico	190.00	168.00	88.4
Rhode Island	580.00	378.00	65.2
So. Carolina	410.00	263.00	64.1
South Dakota	340.00	375.00	110.3
Utah	450.00	260.50	57.9
Vermont	190.00	114.00	60.0
Vet. Admin.	900.00	295.15	32.8
West Virginia	740.00	683.50	92.4
Wyoming	180.00	111.00	61.7
Total	$12,790.00	$11,392.31	89.1

"SELECT DELEGATES EARLY" SOCIETIES URGED

A total of 403 representatives will attend the annual session of the American Dental Association's House of Delegates, scheduled to meet in November. This number is the largest in the history of the Association. Last year's session was attended by 394 delegates.

New York, with the largest membership, will be entitled to 55 representatives in the House of Delegates. Illinois is sec-

ond with 27. In descending order are Ohio, Southern California and Michigan.

A letter sent last month from the Association to constituent societies and federal dental services tells each the number of representatives it may have, and L. M. Cruttenden, assistant secretary of the Association, urges that delegates be selected early so that appointments to reference committees of the annual session can be made during the summer.

Dues from Association members must be received not later than March 31, stated Dr. Cruttenden. Dentists who fail to keep their membership in good standing jeopardize membership privileges, which include insurance policies and their subscriptions to THE JOURNAL. These dentists also will not be listed as members of the Association in the *American Dental Directory.*

PAUL SCHOUBOE NAMED N.B.S. RESEARCH ASSOCIATE

Paul J. Schouboe was appointed a research associate for the American Dental Association at the National Bureau of Standards on January 1.

Mr. Schouboe served three years in the Medical Corps of the Navy during World War II. His most recent employment has been as an analytical chemist with the Naval Powder Factory. In his new position, Mr. Schouboe will assist in the current investigation of resin cements and of the direct filling resins advocated for posterior teeth.

P. J. Schouboe

INDEX TO VOLUME 47 OF JOURNAL AVAILABLE

The index to volume 47 of THE JOURNAL, covering issues of the last six months of 1953, is now available without charge. Requests for copies may be addressed to the Subscription Department, American Dental Association, 222 E. Superior Street, Chicago 11.

DAIRY COUNCIL COOPERATES ON CHILDREN'S HEALTH DAY

The National Dairy Council and its affiliated units cooperated with the American Dental Association in the Association-sponsored National Children's Dental Health Day February 1. The Dairy Council reported a wide distribution, through 76 areas across the nation, of dental health education materials emphasizing the importance of nutrition for good dental health.

About 200,000 posters and nearly 3,000 portfolios of publicity and promotional materials have been distributed in connection with Children's Dental Health Day by the A.D.A. A television script prepared for local use also was distributed.

ASSOCIATION MEMBERSHIP AMONG NAVY DENTISTS RISES

Membership in the American Dental Association by Navy dental officers increased appreciably during 1953, it has been announced by John R. Wallace, chairman of the Council on Membership.

Commenting on the increased enrollment, Rear Admiral Daniel W. Ryan, DC, USN, Chief of the Navy Dental Division, stated in a recent memoran-

dum to staff and district dental officers, "It is gratifying to note the sense of responsibility among our career officers toward membership in our parent society."

Last summer Admiral Ryan issued a staff memorandum urging that membership in the Association be promoted among Dental Corps personnel.

MAIL NEW CATALOG OF DENTAL HEALTH EDUCATION MATERIALS

A new catalog of dental health educational materials has been mailed to Association members by the Division of Dental Health Education of the A.D.A. Council on Dental Health. The catalog lists educational aids—literature, professional aids and audio-visual aids such as films, filmstrips and slides. Additional copies of the catalog may be had from the Association's Order Department, 222 East Superior Street, Chicago.

DENTISTS' SIGNATURES SOUGHT FOR "FREEDOM SCROLLS"

In cooperation with the current Crusade for Freedom campaign on behalf of Radio Free Europe, the Association has distributed to constituent society officials blank "freedom scrolls" to be signed by dental society members, patients and other interested persons in support of the Crusade.

The scrolls may be obtained at the headquarters of the American Heritage Foundation, 345 East 46th Street, New York, and are to be returned there when filled.

During Freedom Week, February 12-22, the signed scrolls will be presented to President Eisenhower in special White House ceremonies. The American Dental Association's House of Delegates has endorsed the Crusade and urged support of its activities.

FLUORIDATION FLIPCHART, SPEAKER'S GUIDE NOW READY

The Council on Dental Health has available a flipchart on fluoridation, prepared to aid dentists who are called upon to give talks on the subject.

The flipchart has 23 pages, each with a different message, which serves as a basis for the talk. The lettering is large enough to be seen by the audience. The chart can be set upright on a table and is accompanied by a speaker's guide. Rental charge is $3 per week, which covers transportation one way. Borrower pays return charges.

"ACCEPTED DENTAL REMEDIES" READY FOR DISTRIBUTION

Current data on the anesthetic, trichloroethylene, are among the new features of the 1954 *Accepted Dental Remedies* now ready for distribution. This 19th edition of *A.D.R.*, prepared by the Council on Dental Therapeutics, contains the latest evaluations of nearly 700 dental products, it is reported.

Among other features included in the 206-page volume are a revised bibliography of therapeutic agents, a section on the role of dentifrices and mouthwashes in dental hygiene, a discussion of the uses of antibiotics in dental practice, an evaluation of agents used to disinfect dental instruments and the latest revision of

the provisions for acceptance of products by the Council.

Copies may be purchased for $2 from the Order Department at the Central Office, 222 East Superior Street, Chicago.

BOOKLET TELLS HOW TO TAKE DENTAL HEALTH INVENTORY

A Dental Health Inventory for Maintown is the title of a new booklet now available from the Association's Order Department. The booklet, issued by the Division of Dental Health Education, tells how interested citizens of a fictional community of 20,000 people analyzed their town's dental health needs and resources in order to design a program "tailor-made" for Maintown.

Single copies of the booklet are available on request; fewer than 25 are 20 cents each; 25 copies are $4.27; 50 copies are $7.35; 100 are $12.75. Prices on larger orders will be supplied on request.

HELAINE LEVIN NAMED TO POST OF NEW CONFERENCE

Miss Helaine S. Levin, film librarian of the American Dental Association, has been named secretary-treasurer of a newly formed organization in the medical film field. The Audio Visual Conference for Medical and Allied Sciences was recently established at a meeting held in Chicago by 11 national medical, dental, health and allied associations and agencies.

A.D.A. FILM LIBRARY ISSUES FILM RETURN INSTRUCTIONS

The Association Film Library asks that all films borrowed from it be returned to the servicing agency, United World Films, Inc., 605 West Washington Boulevard, Chicago, and not to the Association's Central Office.

Whenever films are to be returned directly to the Central Office, the Library states, instructions to that effect will accompany the confirmation received by the film borrower.

In addition, the Library requests that all notices of changes in presentation dates, substitute film selections and cancellations be received within 10 days of the shipping date as noted on the invoice. Failure on the part of the film borrower to give adequate notice makes him liable for payment of the regular rental fee.

COUNCIL ANNOUNCES CHANGE OF DATES FOR WORKSHOP

The educational requirements of the specialty boards will be discussed at the Council on Dental Education's Workshop on Dental Specialty Education, to be held March 10-12 in Chicago.

The dates for this workship were announced as March 3-5 in a previous issue of THE JOURNAL; however, it has been necessary to reschedule the meeting.

Participants in the Workshop will include representatives of the seven specialty boards, dental schools, hospitals which offer internship programs for the specialties and the several State Boards of Dental Examiners which license dental specialists, it has been announced by Boleslaw M. Tylicki, chairman.

COLLECTIONS OFFERED FOR USE ON A.D.A. HISTORY

Several collections of original documents have been offered for use in the writing of *A History of the American Dental Association*, which is being undertaken to commemorate the 100th anniversary of the organization in 1959.

The history will be an account of the development of the American Dental Association against the background of the progress of the profession in the

United States. Known sources for the history are in transactions and other published literature, but unpublished documentary material may exist in the files of older dentists and in libraries, the committee reports.

The committee requests that primary source material which might prove useful in preparation of the history be sent to Lon W. Morrey, at the Central Office of the Association, 222 East Superior Street, Chicago.

PERRY SANDELL NAMED TO HEALTH COUNCIL POST

Perry Sandell, director of the Division of Dental Health Education, Council on Dental Health, has been named to represent the American Dental Association on the Committee on Health Education of the National Health Council.

SOME COPIES OF DIRECTORY STILL AVAILABLE

A limited quantity of the 1954 edition of the *American Dental Directory* is still available, according to John J. Hollister, business manager of the Association.

The new *Directory,* which lists more than 92,000 dentists in the United States, includes information about the nature of each dentist's practice, whether general or specialized, his school and date of dental graduation, and his membership or nonmembership in the Association.

Also listed are names and addresses of schools in the dental field, requirements of state dental examining boards, and other information of interest to members of the profession.

Copies may be obtained at $7.50 from the Order Department of the Central Office, 222 East Superior Street, Chicago.

Dental Societies

AWARD TO BE PRESENTED AT CHICAGO SOCIETY MEETING

A paper on "Organic Constituents of Enamel" by Maurice V. Stack was judged winner of the annual prize essay competition sponsored by the Chicago Dental Society. Dr. Stack, who is an English biochemist doing post-doctoral work at Harvard University, will receive the award at the annual Midwinter Meeting of the Society to be held February 7-10, at the Conrad Hilton Hotel, Chicago. This essay will be published in a future issue of THE JOURNAL.

Featured speaker at the first general session of the meeting will be Walter Judd, Congressman from Minnesota and previously a medical missionary in China. Congressman Judd speaks on "Power Politics in the Pacific."

The scientific program of the meeting consists of essays, limited attendance clinics, movies and table clinics. Demonstration clinics will be presented by the dental schools of Northwestern University, University of Illinois and Loyola University. One scientific exhibit will demonstrate the use of closed circuit television in teaching.

Among the associated groups holding functions immediately prior to the meeting are the American College of Dentists, the International College of Dentists, the Illinois Unit of the American Society of Dentistry for Children and the fraternities Alpha Omega, Delta Sigma Delta, Psi Omega and Xi Psi Phi.

Major Lyle F. Aseltine (in service) is general chairman for the Midwinter Meeting, and Robert F. Tuck is serving as acting general chairman.

WISCONSIN SOCIETY TO MEET AT MILWAUKEE IN APRIL

Milwaukee will be the location of the annual meeting of the Wisconsin State Dental Society, which will be held April 20-22.

Among the out-of-state essayists who will appear on the program are Carl W. Gieler of Chicago, Leslie M. FitzGerald of Dubuque, Iowa, John H. Mosteller of Mobile, Ala., Harry Sicher of Chicago, F. Raymond Garvey of St. Paul, Helmut Zander of Minneapolis, Clarence Simpson of St. Louis, Donald C. Winans of Detroit, Gustav W. Rapp of Chicago, Stanley C. Harris of Chicago and Harold Hillenbrand of Chicago.

Wisconsin essayists will include F. J. Fleege and G. C. Kreuter. Attorney Clifford A. Randall of Milwaukee will be the speaker at the annual luncheon.

The program will include study courses, table clinics and motion pictures.

REGISTERED CLINICS FEATURED AT PHILADELPHIA MEETING

The Greater Philadelphia Meeting, to be presented by the Philadelphia County Dental Society February 3-5 at the Bellevue-Stratford Hotel, will feature registered clinics by Marvin Evans and L. Bodine Higley of Chapel Hill, N. C.; Jerome M. Schweitzer of New York; Earl L. Lampshire of Lincoln, Neb.; Grant Van Huysen of Indianapolis; J. Orton Goodsell of Saginaw, Mich.; Saul Schluger of Jersey City and George A. Buckley of Brooklyn.

Symposiums on dental public health, prosthetic dentistry and general dentistry will be presented, as well as a panel discussion on "The General Health of the Dentist" by five faculty members of the Temple University Medical School.

Joseph V. Masino of Philadelphia is general chairman of the meeting.

SOCIETY OF ORAL SURGEONS CHANGES MEETING PLACE

The next annual session of the American Society of Oral Surgeons will be held in the Hollywood Beach Hotel, Hollywood, Fla., November 3-6, during the week preceding the 95th annual session of the American Dental Association. The change in meeting place was announced by Don H. Bellinger of Saginaw, Mich., Society president.

FIRST DISTRICT SOCIETY OF NEW YORK TO OFFER COURSE

Restorative procedures in fixed and removable bridgework will be the subject of a postgraduate course to be presented in March by I. Franklin Miller and S. Charles Brecker under the auspices of the First District Dental Society of New York.

Simon, Ben and Jack Shapiro, three brothers and three past presidents of the Second District Dental Society, shown at the Past Presidents' Breakfast of the Greater New York Dental Meeting.

The lecture, demonstration and participation course will include precision attachment construction, porcelain bridgework and electronic surgery, emphasizing preparations for all types of full coverage abutments used in extensive restorations.

Applications may be addressed to Jules B. Seldin, supervisor, First District Dental Society Postgraduate School, Hotel Statler, New York 1.

FOUR FIFTHS OF MEMBERSHIP ATTEND REVIEW DAY

At least 100 of 125 members of the Southern Maryland Dental Society attended the first annual Review Day in Oral Roentgenology held in Washington, D. C., January 6.

Pointing out that the practitioner often has difficulty keeping up with trends and procedures which evolve after his graduation from a professional school, the Society's announcement said, "A day solely dedicated to a comprehensive review of a single phase of dental practice can serve well all segments of our profession."

Daniel F. Lynch, president-elect of the American Dental Association, represented the Association at the Review Day luncheon.

CLASSIFIED DIRECTORY TO RESTRICT LABORATORY ADS

Dental laboratories which advertise in the Chicago classified directory will hereafter be required to include in their copy the statement: "We make dentures upon receipt of impressions from Illinois dentists only."

This requirement was announced by the publisher of the directory after a recent conference with officers of the Illinois State Dental Society, the Chicago Dental Society and the State Department of Registration and Education, Illinois State Examining Committee.

The dental societies had asked that the directory discontinue the publication of display advertisements by dental laboratories, on the grounds that these advertisements are directed at the lay public and solicit direct dealings with the public.

Dental Education

DENTAL SCHOOLS ASSOCIATION ISSUES MARCH 21-24 PROGRAM

A discussion of specialties in dentistry and their relation to dental education, to be moderated by Leslie M. FitzGerald, president of the American Dental Association, will be a highlight of the 31st annual meeting of the American Association of Dental Schools, to be held March 21-24, at the French Lick Springs Hotel, French Lick, Ind.

In addition to the discussion of specialties, two other general sessions also are planned, it has been announced by Maynard K. Hine, president of the A.A.D.S. The teaching of endodontics will be discussed by five essayists, with Louis I. Grossman of the University of Pennsylvania School of Dentistry acting as moderator. Methods of teaching and their relations to the methods of evaluation employed by state and national examining boards will be the subject of the third session, to be presided over by Harold J. Noyes of the University of Oregon Dental School.

Two business sessions and 14 conference sessions in various areas of dental education also will be presented. Herman B Wells, president of Indiana University, and H. Trendley Dean, secretary of the American Dental Association Council on Dental Research, will address the annual A.A.D.S. dinner March 22. Franc Lewis McLuer, president of Lindenwood College, will speak at the Omicron Kappa Upsilon dinner March 23.

DENTAL SCHOOL ENROLLMENT CONTINUES TO INCREASE

This year's *Dental Students' Register* shows a continuing rise in the number of students enrolled in both undergraduate and graduate programs in the dental schools. The data presented were obtained through a survey of the 43 dental schools, 31 dental hygiene schools and four dental laboratory technician schools in the United States.

On October 15, 1953, there were 12,516 undergraduate dental students, 72 per cent more than were enrolled in 1945. A total of 1,794 students are currently attending dental hygiene schools.

The 1953-54 *Dental Students' Register* is available through the Council on Dental Education, at the Central Office, 222 East Superior Street, Chicago.

ROBERT MOYERS SCHEDULED FOR ESSAY AT COLUMBIA

"The Physiology of Centric Relation" is the subject of an essay to be given March 31 by Robert Moyers, of the University of Michigan dental school. This is the first Rose Cohen Memorial Lecture sponsored by Columbia's division of periodontology. All members of the profession are invited to attend.

ARMED FORCES INSTITUTE GIVES ORAL PATHOLOGY COURSE

The first attempt to teach pathology of the oral cavity to both dentists and physicians simultaneously will be made by the Armed Forces Institute of Pathology, in a postgraduate course March 8-12, announced Col. J. L. Bernier, DC, USA, chief of the oral pathology section.

The faculty will consist of Isaac Schour of the University of Illinois, Myron Aisenberg of the University of Maryland, Lester R. Cahn of Columbia University, Helmut Zander of the University of Minnesota, Joseph P. Weinmann of the University of Illinois, Harry Sicher of Loyola College of Dentistry, Chicago, and Col. Bernier.

Further information may be obtained from Colonel Bernier at the Institute.

LECTURES, SEMINARS OFFERED BY DENTAL SCHOOLS

California • A general review course in dentistry will be offered for eight weeks, starting April 19, by the University of California Extension.

Didactic lectures in the following subjects will be given; anatomy, anesthesia, biochemistry, chemistry (both organic and inorganic), crown and bridgework, dental materials, histology, materia medica, metallurgy, operative dentistry, orthodontics, oral diagnosis, oral surgery, pathology, pedodontics, prosthetics, physiology, roentgenology and therapeutics.

More than one half of the time will be devoted to laboratory technics and clinical procedures with patients.

Further information may be obtained from J. Eugene Ziegler, head of the dental program of the University, 815 South Hill Street, Room 211, Los Angeles 14.

Emory • Facilities for a two day program in implant dentures, to be held March 18-19, are being provided by Emory University School of Dentistry. The program will be under the direction of Col. Roy L. Bodine, Jr., DC, USA, assisted by Alvin J. Fillastre, of Lakeland, Fla., Wayne S. Paullus, of Miami, Fla. and Philip S. Loechler, of Rochester, Minn.

The University wishes to make clear that its sponsorship of the program does not necessarily mean endorsement of implant dentures. It wishes merely to make available information on a subject which it believes is of current interest to the profession.

Further information on the program may be obtained from E. W. Willett,

chairman, committee on continuation study courses, Emory University School of Dentistry, Atlanta, Ga.

Northwestern • A one-week postgraduate course in periodontics will be offered February 1-5, 1954, at Northwestern University Dental School for interested practitioners.

Laboratory studies and clinical demonstrations of the etiology, diagnosis and treatment of diseases of the gingival tissues will be included, as well as the diagnosis and control of traumatic influences and a comparison of the benefits of palliative and surgical treatment.

Registration in this course is limited. Information may be obtained from the director of graduate study, Northwestern University Dental School, 311 East Chicago Avenue, Chicago 11.

Tufts • The postgraduate division of Tufts College Dental School announces the following refresher courses:

Oral pediatrics, to be presented July 12-16 by John C. Brauer, dean of the University of North Carolina School of Dentistry; inlay construction, to be presented April 11-15 by Donald A. Keyes of the University of Nebraska. Enrollment in both classes will be limited.

Information on either course may be obtained by addressing the division of graduate and postgraduate studies, Tufts College Dental School, 136 Harrison Avenue, Boston 11.

DENTISTS OFFERED RESIDENCIES, SCHOLARSHIPS

Henry Ford Hospital • Rotating internships and residencies to cover a two year period are available at the Henry Ford Hospital effective September 1, it has been announced. All branches and phases of dentistry are covered. Applicant must be a graduate of an accredited American dental school and must have the recommendation of the dean. Inquiries may be addressed to Fred A. Henny, chief of the division of dentistry and oral surgery, Henry Ford Hospital, Detroit 2.

California • Applications for a three year graduate program in oral surgery leading to a Master's Degree are now being accepted by the University of California College of Dentistry.

Further information may be obtained from the dean's office, University of California College of Dentistry, Medical Center, San Francisco.

North Carolina • The second class of graduate students in orthodontics will be admitted in June, 1954, by the School of Dentistry, University of North Carolina. The course leads to certification or the Master's Degree. A graduate degree or certification will also be initiated in oral surgery in September, 1954. Communications may be directed to Dean, School of Dentistry, University of North Carolina, Chapel Hill.

TUFTS MIDWINTER MEETING OFFERS COURSES TO ALUMNI

A total of 28 courses is being offered to alumni by the Tufts Dental School Alumni Association during its midwinter meeting. The midwinter meeting, scheduled for March 9 and 10, will be held in the form of a series of postgraduate courses, each one day in length.

Further information may be obtained from the Alumni Association, 136 Harrison Avenue, Boston 11.

BRONX VA HOSPITAL OFFERS RESIDENCIES

Two residencies, one in oral surgery, one in prosthetics, will be offered to qualified dentists at the Bronx Hospital, beginning July 1, the Hospital has announced. Candidates must have com-

pleted an internship in an approved hospital or have attended at least one year's postgraduate training in an approved dental school.

Application blanks and further information may be obtained from the Chief of Dental Service, VA Hospital, 130 West Kingsbridge Road, Bronx, N. Y.

National Defense

UPGRADING OF NAVY DENTISTS ALREADY UNDERWAY

Approximately 200 of the 1200 reserve dental officers on active duty as of December 10 have received promotions, according to Admiral Ryan, chief of the Navy Dental Corps. Another 500 will have their promotions accelerated. In addition readjustments of rank for 125 dental officers are being processed.

NAVY ACCEPTS DENTAL BOARD EXAMINATION CERTIFICATES

In a letter dated January 11 to the National Board of Dental Examiners, Daniel W. Ryan, Rear Admiral (DC) USN, Assistant Chief for Dentistry and Chief of the Dental Division, announced that the Navy now recognizes and accepts certificates of the National Board as evidence of satisfactory professional qualification of candidates for appointment as officers in the Dental Corps of the U. S. Navy or U. S. Naval Reserve.

In addition to recognition by the Navy, the certificates and grades of the National Board are accepted as partial fulfillment of requirements for the practice of dentistry by 28 states, by Puerto Rico, by the Public Health Service and by the U. S. Army.

GEORGE T. PERKINS HEADS WALTER REED DENTAL DIVISION

Col. George T. Perkins, U. S. Army, survivor of the Bataan death march of World War II, is the new director of the

Col. G. T. Perkins

Dental Division, Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D. C.

Replacing Col. John S. Oartel, U. S. Army, now on assignment to the Far East, Col. Perkins came to Washington from Battle Creek, Mich., where he was chief of the Dental Service at Percy Jones Army Hospital.

DEFENSE DEPARTMENT RULE CORRECTS INEQUITY

A recent modification of the provision within the Department of Defense directive of October 7, 1953, governing rank entitlement for dental and medical officers, provides that all professional experience between the date of graduation from dental school and the date of receipt of orders to active duty must be counted.

Under the original directive, the Armed Forces were directed to count only the professional experience between date of graduation and date of appointment to commission. Thus a dentist who received a commission at a time when he had little professional experience, and

who was recalled for active duty after a period in the Reserves, might not receive credit towards rank for the intervening years of experience.

Under the new ruling the dentist receives credit for all professional experience.

Defense Department action was taken in response to a request for rule modification made by the American Dental Association. Within two weeks of the time the Association pointed out the inequity, the change was made.

HOLD FIRST ALL-KOREA INTERSERVICE DENTAL MEETING

An all-Korea interservice dental meeting, the first of its kind, was held in Seoul November 28 and 29, 1953, under the auspices of the Eighth Army Dental Section. Planned originally for about 100 dental officers, the accommodations had to be trebled. Enthusiasm was such, it is reported, that every effort is being made to have the affair become an annual event.

More than 300 dental officers from 10 countries attended. The United States Army, Navy, Air Force and Marines were represented.

"Planning for a meeting of this size in Korea presented many unique problems," reports Lt. Col. Herbert L. Gullickson, DC, USA. "No hotels as such existed. No restaurants were available."

Borrowing a hospital train solved the housing problem. The same train doubled for transportation. Various units in the Seoul area took care of the food.

The meeting was conducted in an in-

Discussing the events of the All-Korea dental convention which they are attending at the Chosen Hotel are (l. to r.): Lieut. Harold H. Roelike, DC, USN, of Melrose, Minn.; Maj. S. Geoffrey Bagnall, 25th Canadian Field Dental Unit, of Halifax, Nova Scotia; Capt. Honorio Metoto of Manila, the Philippines; Capt. Ingrid Ahesson, Swedish Hospital, Pusan, of Stockholm, Sweden; Capt. E. G. Brown of Newcastle, England; Maj. Vernon J. Sture, 5th Air Force, of Sacramento, Calif.; Lt. Col. Hoh Ria Young, chief of the Korean Dental Corps, and Y. K. Lee of the Dental University, Seoul.

Newly elected officers of the Panama Canal Zone Dental Society for 1954 are Lt. Cmdr. A. L. Teitel, DC, USNR (left), secretary-treasurer, and Capt. K. M. Broesamle, DC, USN (second from left), president. Shown with them are retiring officers of the Society, Lt. Col. H. A. Brayshaw, DC, USA (second from right), former president, and Maj. C. F. Atkins, DC, USA (right), former secretary-treasurer.

formal manner, with lectures, table clinics and discussion by the participating dental officers. Emphasis was on practical application of procedures for field use.

Lecturers for the program were Col. Alfred E. Toye, Tokyo Army Hospital; Lt. Col. Edmund S. Olsen, Yokohama Army Hospital, and Capt. Robert M. Booth, Korean Military Advisory Group.

ISSUE RULES ON DENTISTS SUBJECT TO REGULAR DRAFT

The National Headquarters, Selective Service System, in a recent operations bulletin, has directed local boards to postpone ordering into the military service as enlisted men those dentists and physicians liable for military service under the regular draft law. In order to obtain such a postponement of induction, the dentist or physician concerned must either have applied for or obtained a commission in one of the Armed Forces or the Public Health Service.

The local boards were also urged to consider seriously the deferment of dental interns on the same basis as medical interns if they have accepted internships of not more than one year in duration.

As the bulletin outlines the procedure for processing dental graduates who are liable for draft as both special and regular registrants, deans of dental schools may be interested in obtaining copies of the bulletin in order to inform themselves and their senior students.

The operations bulletin is contained in Information Release No. 12, issued by the National Advisory Committee to the Selective Service System, 451 Indiana Avenue, N.W., Washington 25, D. C.

Public Health

DENTAL PUBLIC HEALTH BOARD CERTIFIES FIVE DIPLOMATES

Five public health dentists have been certified as diplomates of the American Board of Dental Public Health, as a result of the certifying examination given by the Board September 24-25 in Cleveland.

The new diplomates are Harry W. Bruce, Jr., Arthur Bushel, Donald J. Galagan, Zachary M. Stadt and Chester V. Tossy.

The Board will hold its 1954 certifying examination next November 4-5 in Miami, in conjunction with the annual meeting of the American Dental Association. Candidates must submit their applications to the secretary of the Board not later than July 5, 1954. Information and application forms may be obtained from the secretary, Philip E. Blackerby, Jr., 250 Champion Street, Battle Creek, Mich.

COLORADO MEDICAL SOCIETY DECLARES FLUORIDATION SAFE

Additional confirmation of the safety of the fluoridation of community water supplies was provided last month by the El Paso County Medical Society (Colorado Springs, Colo.).

In a resolution passed without opposition December 9, the Society stated that, although the water supply of Colorado Springs has for 75 years contained more than two and one-half times the amount of fluoride ions which is recommended for the prevention of dental caries, no clinical symptoms have been observed among patients which could be attributed to the use of fluoridated water.

The resolution has been put at the disposal of the dental profession.

H. W. HEINZ ASSUMES POST OF NEBRASKA DENTAL DIRECTOR

H. W. Heinz assumed the post of director of the Division of Dental Health of the Nebraska Department on November 1, it has been reported.

Following his graduation from The College of Dentistry of the University of Nebraska in 1935, Dr. Heinz engaged in private practice for six years in Lincoln. From 1941 until his present appointment he specialized in pedodontics in the Beatrice (Neb.) State Home.

He is a member of the American Dental Association, and has been secretary-treasurer of the Southeast District Dental Society of Nebraska for the last four years.

FLUORIDATION ATTEMPT HALTED BY JUDGE

Plans to fluoridate the water supply of Shreveport, La., were given a setback January 4, when District Court Judge James U. Galloway issued a preliminary injunction against the city. This is the first time in the fight for fluoridation that a court has issued an injunction to prevent fluoridation.

Although admitting that "the accumulated evidence does indicate that fluorine in public water supplies reduces the incidence of tooth decay," the Judge declared that fluoridation was neither a matter of public health nor general welfare.

The city plans an appeal from the injunction.

TWO CITIES APPROVE, ONE VOTES ON FLUORIDATION

San Diego residents will vote on the question of fluoridation when they go to the polls next June. The city has used fluoridated water since November, 1952, but opponents of its use have forced the issue to a referendum.

Rear Admiral H. Lamont Pugh, Surgeon General of the U. S. Navy, pointing out that thousands of Navy and Marine Corps dependents live in San Diego, urged the retention of fluoridation. He said, "Fluoridation of community water has been approved and is urged by virtually every responsible state and national health organization."

At elections in Sault Ste. Marie, Mich., and Waycross, Ga., voters cast ballots overwhelmingly in favor of putting fluoride into their drinking water.

Research

EUROPEAN RESEARCHERS TO EXCHANGE FLUORINE DATA

The European Coordination Center for Fluorine Research and Dental Caries Prophylaxis was organized November 7 in Constance, Germany, "to unite the personalities working actively in these fields, and to strive to spread the thera-

peutic measures resulting from experiments made by its members or eventually to point out their misuse."

Only scientists doing clinical or experimental research in these fields will be accepted as active members, announced A.-J. Held of Geneva, Switzerland, president. Members must be willing to share the result of their work and collaborate without distinction of nationality, Dr. Held stressed.

Other officers of the new organization include H. R. Held of Geneva, vice-president; H. J. Schmidt of Stuttgart-Degerloch, Germany, and S. Koller of Wolfsberg, Austria, second secretary.

At the present time the headquarters of the European Coordination Center is at the Institut Universitaire de Médecine Dentaire, 24, rue Micheli-du-Crest, Geneva, Switzerland. The first meeting of the organization will be held during 1954 in Salzburg, Austria.

ELEVEN SCIENTIFIC SESSIONS PLANNED BY RESEARCH GROUP

Eleven scientific sessions are planned by the International Association for Dental Research for its general meeting in French Lick, Indiana, March 19-21.

At least 22 reports will be devoted to the subject of dental caries. Subjects include the chemistry of saliva, enamel and dentin. Anesthetics, irradiation, metabolism and growth, and microscopy using the electron microscope also will be covered.

All scientific sessions are open to members and guests.

DENTAL GROUP LAST ON LIST OF RESEARCH GRANTS

Dental research for 1953-54 has been granted $20,342 by the U. S. Public Health Service. This amount is only 0.3 of one per cent of the total grants of $6,428,435 made to eight medical research categories. Dental research received the smallest amount of any group. Of the 11 dental project applications made, only five were granted.

The awards followed recommendations by the advisory council to the National Institute of Dental Research at its November-December meeting.

International

AMERICANS TO BE INVITED TO ALGERIAN CONGRESS

Two Americans will be invited to attend the second international dental congress of the Algerian Federation of dental societies, along with eight other international guests. The congress is scheduled for April 12-18, in Oran, and transportation costs from Paris to Oran and return will be paid by the Federation.

ISRAEL DENTAL ASSOCIATION PLANS POSTGRAD PROGRAM

A postgraduate course on complete denture prosthesis, under the direction of M. Rotter, is one of nine postgraduate courses being offered by the Dental Association of Israel, in Tel-Aviv.

Communications may be addressed to the Association at 56 Achad Haam Street, Tel-Aviv, Israel.

HOLLAND TO BE HOST TO INTERNATIONAL GATHERING

Holland is to be host to the annual meeting of the International Dental Federation, which is scheduled tentatively for June 6-13 at the Schevingen, the Hague. Inquiries about the meeting should be addressed to G. H. Leatherman, secretary general of the Federation, at 35 Devonshire Place, London, W.1.

General

OLDEST DENTAL JOURNAL SUSPENDS PUBLICATION

Dental Items of Interest, reputedly the oldest continuously published dental journal in the world, suspended publication with its December, 1953, issue. Founded in 1878, the magazine observed its 75th anniversary last year.

The recent deaths of the publisher, Mendel Nevin, and the editor, Paul H. Belding, were termed contributing causes of the decision to discontinue the periodical.

Dr. Nevin, president of a dental manufacturing firm and of the Dental Items of Interest Publishing Company, was general manager of the magazine and assisted in its editorship for decades. He died in November 1952. Dr. Belding, who had been editor for 16 years, died in June 1953.

During its 75 years of continuous publication, *Dental Items of Interest* had only three editors: T. B. Welch, a physician (1878-1896), Rodrigues Ottolengui (1896-1937) and the late Dr. Belding (1937-1953). Dr. Ottolengui, editor for 41 years, gained eminence not only as a dental editor and scientific author, but also as a naturalist and novelist.

The Dental Items of Interest Publishing Company will continue to publish dental books, it has been announced.

ORTHODONTISTS' ASSOCIATION PLANS ESSAY CONTEST

A prize essay contest will be conducted this year by the American Association of Orthodontists, to find the best paper representing original investigation and containing "some new significant material of value to the art of science of orthodontics."

A prize of $500 will be awarded for the essay judged to be the winner, and the author of the winning essay will be invited to present his paper at the next meeting of the American Association of Orthodontists, May 16-20, 1954 in Chicago.

Papers may be submitted by any member of the A.A.O. or by anyone affiliated with a recognized dental institution as a teacher, researcher, undergraduate or graduate student.

Essays should be submitted in triplicate on or before March 1, 1954, to John R. Thompson, 311 East Chicago Avenue, Chicago 11. Further information may be obtained from Dr. Thompson at the same address.

INTERPROFESSIONAL HEALTH MEETING TO HEAR DENTISTS

Two New York dentists will participate in the first Interprofessional Health Conference, to be presented February 21 by the national optometric fraternity, Omega Epsilon Phi, as a feature of the bicentennial celebration of Columbia University.

Alfred J. Asgis will discuss "Occupational Health Promotion for National Security" as a member of a panel on cooperation among the health professions. Joel Friedman will discuss "Oral Health for the Community" as a member of a panel on the community relations of the health professions. Dr. Asgis, co-chairman of the Conference, will preside at the second panel.

ACADEMY OF ORAL PATHOLOGY TO MEET IN FEBRUARY

The annual meeting of the Academy of Oral Pathology has been set for February 7, at the Conrad Hilton Hotel, Chicago.

Principal speakers on the program are David Mitchell, S. Rothman, J. L. Bernier, George Stein, Harry Sicher, Odus L. Baldridge, Charles A. Waldron,

Kurt H. Thoma, Donald A. Kerr, H. B. G. Robinson and Paul E. Boyle.

All dentists and others interested in the field of oral pathology are invited to attend.

BOARD OF ORAL SURGERY SETS EXAMINATION DATE

May 8-10 are the dates set by the American Board of Oral Surgery for its next certification examination, which will be held at the Blackstone Hotel, Chicago.

Candidates are advised to address L. M. FitzGerald, secretary-treasurer, American Board of Oral Surgery, 718 Roshek Building, Dubuque, Iowa.

LOYOLA (CHICAGO) ALUMNI ANNOUNCE MEETINGS

The Alumni Association of the Chicago College of Dental Surgery, Loyola University, will hold its annual party during the Chicago Midwinter Meeting February 9 from 4:30 p.m. to 6:30 p.m. in the Conrad Hilton Hotel. The organization will also maintain headquarters in the Hotel during the meeting.

The College's annual homecoming program of scientific sessions and table clinics, to be presented April 28 at the Dental Building, will be climaxed by a banquet at the Congress Hotel, Chicago.

HINMAN CLINIC FEATURES ESSAYISTS AND CLINICIANS

Seven prominent men are featured as essayists and clinicians at the next session of the Thomas P. Hinman Mid-winter Clinic, according to the Clinic's announcement. The session will take place March 21-24 in Atlanta, Ga. Those featured in the announcement are Lloyd H. Dodd, of Decatur, Ill.; E. Cheraskin, of the University of Alabama; F. D. Ostrander, of the University of Michigan; Joseph H. Johnson, of Toronto, Canada; William E. Koch, Jr., of St. Louis; Arthur Roberts, of Aurora, Ill. and Jacob Schwartz, of New York.

DENTISTS WIN RECOGNITION IN ELECTION OF CARLOS H. SCHOTT

The Cincinnati Public Health Federation gave the dental profession recognition recently, when it elected Carlos H. Schott president at its 36th annual meeting. The post was previously held by a physician.

Dr. Schott has spent 45 years as an active member of the Public Dental Service Society, which he helped to found. He also founded the first free dental clinic for school children in Cincinnati.

JOHN KNUTSON, SON HURT IN CHRISTMAS EVE CRASH

John W. Knutson, assistant surgeon general and chief of dental services for the U. S. Public Health Service, and his son, Paul, 9, were seriously injured in a Christmas Eve auto accident. The condition of both is reported as favorable. Dr. Knutson's other children, who were with him, received minor injuries. At the time of the accident, they were returning from a visit to Mrs. Knutson, who had recently undergone major surgery.

International Correspondence

NEWS FROM GREAT BRITAIN

The dental schools of Great Britain are faced with an extraordinary problem, one that is serious for the future treatment of the community, writes Professor H. H. Stones, dean of the University of Liverpool Dental School. It is the present reduction in the number of prospective students who have passed the necessary examination in general education.

In 1938, the year before the second World War, the total number of new students admitted into the dental schools of Great Britain and Northern Ireland was 433. During the war, in order that the number should not be unduly depleted, dental applicants—as well as medical—were allowed to enter the schools and, provided their progress was satisfactory, were allowed to qualify before being called up for service with the Armed Forces. Undue advantage was not taken of this arrangement as the yearly average number of new students was below 300 during the war.

With the termination of hostilities and the consequent demobilization, the years immediately following showed a considerable increase in applications and all dental schools were filled to more than capacity. This was undoubtedly assisted by grants that were made to ex-servicemen. Thus the number of new students accepted was as follows: 1948—579; 1949—642; 1950—501; 1951—559.

Subsequently when the requirements of the ex-servicemen had been met so that the postwar bulge had subsided, the yearly entry into the dental schools decreased.

This decrease is a serious threat to the dental health of the community, as at the present time there are not enough dentists to give the treatment that is considered necessary according to modern standards. The position is made worse by the uneven age distribution in the *Dentists' Register*, which contains a high proportion of the older age groups.

In the final report of the Interdepartmental Committee on Dentistry in 1946 it was recommended that an annual entry of 900 new students should be the aim; of these 800 would probably qualify. On this basis it would take 20 years for the number of dentists in Great Britain to increase to 20,000, which might be taken as a desirable working figure. The 300 to 320 new British dentists added by the enrollment of students in 1953 falls far short of that target.

National Health Service • John W. Gilbert writes this month of some of the details of administration of the General Health Service which in each locality is the responsibility of the 167 Executive Councils —each consisting of 25 members, 8 appointed by the Local Health Authority, 5 by the Minister of Health, 7 by the Local Medical Committee, 3 by the Local Dental Committee and 2 by the Local Pharmaceutical Committee. From the area covered by each Executive Council are elected representatives of the dental profession to form the Local Dental Committee—the dental "voice" and representation for matters concerning the General Dental Services of the National Health Service.

All dental practitioners working within the General Dental Services have a contract with their appropriate local Executive Council. Each of these bodies, in addition to its administrative responsibilities, makes monthly payments for

work done, provides machinery for determining disputes or complaints between patients and practitioners and acts in a disciplinary capacity when the occasion arises.

Of approximately 15,000 practitioners on the *Dental Register,* about 3,000 are employed in the School Dental Service, the Armed Forces, the hospitals and teaching schools and in other full-time public appointments; the balance of about 12,000 dentists represent those potentially available for providing treatment to the general public under the General Dental Services. Of these 12,000 only 400 to 500 are not in contract with Executive Councils. These essentially private practitioners are in the main in practice in the West End of London and, to a far lesser extent, in the centers of the larger towns. They rely for their patients on those members of the public prepared to pay the whole cost of their dental treatment.

It is obviously virtually impossible for a newly qualified practitioner to set up practice and expect patients to visit him and pay the whole cost when other long-established practitioners in the vicinity are providing services free or nearly so. New members of the profession are therefore obliged to enter the General Dental Service. It appears inevitable that, as the present practitioners outside the National Health Service die or retire, the numbers of those not in contract must steadily decrease until they cease to exist altogether.

Private Practitioners • Cyril De Vere Green writes of the recent retirement from the dental profession of a man who did not practice in the Health Service, and whose name must be known to a large number of his colleagues throughout the world—J. Menzies Campbell. He is perhaps the leading authority in the world, most certainly in this country, on dental history and on the personalities who in the past have played an important part in the shaping of the dental profession in both the United States and Great Britain.

Dr. Campbell, besides having English professional qualification, is a graduate of the University of Toronto, a Fellow of the International College of Dentists and the Royal Society of Edinburgh. He has many friends in Canada and the United States who have visited him at his home in Glasgow. I am quite certain they would join us in wishing him many happy years of retirement.

It may not be commonly known, but the dental profession in this country has had great difficulty in obtaining dental supplies of American manufacture since before this last war, because of regulations governing foreign exchange. It was quite common for practitioners from this country, when on holiday in Switzerland, to spend some of their vacation currency allowance by visiting the dental depots in that country, where they could purchase small items of dental supplies manufactured in the United States.

The present situation is not very much better although there is a tendency to obtain American dental goods in Sweden, with which country there is a freer interchange of currency at the moment.

General Items • The many friends of E. Wilfred Fish in the United States will no doubt wish to congratulate him upon the honor of knighthood, which has been conferred upon him in the recent New Year's Honor List. The contributions which Wilfred Fish has made to the science and practice of dentistry throughout the world are thus fittingly recognized, to the great pleasure of his many friends and colleagues here in Great Britain.

G. H. Leatherman, D.M.D., F.D.S.R.C.S.

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

A PATIENT SALUTES DENTISTS

I have just come from my dentist's chair and realize once more how much it has meant for years to know that skill and patience and relief from dental distress are always available. I asked him during a pause in the proceedings, "Is there a monument to dentists anywhere?" He laughed and replied, "I've never heard of one."

More seriously, I wonder whether grateful patients haven't established scholarships for dental students, as people do in so many fields these days.

It occurs to me, as one of those patients who is grateful but happens not to have funds of her own, that it would be interesting to find out first of all, whether such scholarships do exist anywhere, and whether, if reprints of this letter in your columns were made available to dentists for enclosure in statements, an occasional patient of means might not be moved to do something about it.

Clara Leiser, New York, N. Y.

ASKS FULLER COVERAGE OF ANTI-FLUORIDATION ARGUMENTS

I am one who thinks he thinks, and at the present time I am thinking about fluoridation of the public drinking waters of this community and of this country. I see evidence of its increasing popularity and I wonder if this is right. I feel that the adage, "be not the first . . . nor yet the last" applies here.

I am looking at both sides of this "controversy"—and I guess it is a controversy since arguments are presented on both sides. Although the American Dental Association has long since endorsed fluoridation, perhaps not all its members do. Anyway, we would feel better informed if "anti-fluoridation" arguments were presented.

I, and others, are looking to our official publication, THE JOURNAL, to present both sides.

Normand J. Paquette, Waterville, Me.

Reply • In reply to the above letter of Dr. Paquette one might say that all objections to fluoridation should be weighed and analyzed on the basis of existing scientific evidence. An hypothesis is judged true or false on the basis of the amount and kind of scientific evidence brought to bear in support or refutation of the hypothesis.

The hypothesis that optimal amounts of fluorides in a domestic water supply provide a large measure of dental caries control has been subjected to experimental verification in a number of independent studies, and the hypothesis has been sustained.

Any true scientist is always conscious of the possibility of error and that later proof may show some assumption was incorrect. At the same time, a scientist can only base his judgment on known observable facts collected in accordance with the strictest scientific methodologies. At present in the light of accumulated knowledge the weight of scientific evidence is overwhelmingly on the side of the proponents of fluoridation.

USE OF SELF-CURING ACRYLIC RESINS QUESTIONED

The comments and arguments on self-curing acrylic resins which are appearing in our JOURNAL would not have to appear if the Association would make sure that products which appear on the market are checked before its members fall "hook, line and sinker" for them.

Those who did not get on the bandwagon in 1949 when salesmen first tried to sell self-curing acrylics were laughed at as old-

fashioned. Those who did try them found out that these materials were not what they were said to be.

Many men who found out the hard way are now 100 per cent against any acrylic resin which is self curing. I have checked any number of these materials and still feel that much has to be done to make them biologically and physically acceptable in the general practice of dentistry.

The July 1953 *Journal of the Wisconsin State Dental Society* contained an article of mine in which this fact was stressed, and as of this time my opinion has not changed, though I have used newer methods of placing and newer materials.

I feel that members of the Association should be protected; in this way their patients will be protected. Any filling material should be checked by a group whose members are not only in research laboratories, but also in general practice.

Reports should be submitted to the American Dental Association and conclusions should be drawn as to whether a product will be approved. If not, a member who uses the product is doing so at his own risk and with his eyes open as to its limits.

D. E. Holtman, D.D.S., Two Rivers, Wis.

ISRAELI DENTAL SCHOOL DESCRIBED

On October 26, 1953, I received a letter from a member of the Israeli Dental Association in which he says:

"The periodical, at present, is stopped, but at the last meeting it was decided to issue it again. We hope to do so within two or three months. The reason is expense and there are no funds.

"We gathered from members about 12,000 Israeli Pounds and gave it to the University for the purpose of opening a dental school. We are lucky that the school will open in November this year with a beginner class of 15 students. They will study three and one half years with medical students and two and one half years with dental students and dental educators.

"Presently we are engaged in fixing the building which we received for the dental school. It has two floors with many rooms, close to 800 square meters of floor space. We are short in funds even for this, and more so for the preparation of a clinic, as well as a chemical and bacteriological research laboratory.

"Everything is slow because of lack of money. We began to organize a new library because the previous one was burned in the War."

When I left Jerusalem for military service in the United States, the Israeli dentists had an organized clinic of two chairs but no students other than interested practitioners who wished to study the *modus operandi* of their colleagues. Patients were sent through the Straus Health Center, with no distinction as to religion, color or creed.

The major equipment for that clinic was donated by Professor Berl Gottlieb. The dentists giving services received no pay, nor did patients pay for services rendered. Smaller instruments and equipment were donated by dentists and technicians who were members of the Israeli Dental Association.

The library consisted of periodicals in many languages; again, most came from Professor Berl Gottlieb. I organized the material for easy reference and made a card file.

The Arab Dental Group, to show that they were interested, donated a skeleton of the human body. After I left, however, everything was destroyed in the war.

I believe that it would be worth the effort of American dentists to cooperate fully in the reorganization work of the Israeli dentists. Any aid may be sent directly to the School of Dentistry, in care of Hebrew University, Israel.

Jacob Kasen, D.D.S., McKeesport, Pa.

Book Reviews

PERIODONTOLOGY, DIAGNOSIS AND TREATMENT

By Frank E. Beube, D.D.S. First edition. 753 pages with 492 illustrations. Index. Price $15. New York, The Macmillan Co., 1953.

Dr. Beube has presented the profession with a well organized, compact text. It is simply and clearly written. It is not encyclopedic in scope, but adequate references to the literature are included to provide an introduction for the investigator or student to the voluminous subject matter of periodontology.

The author's research and clinical experience are revealed by the emphasis placed upon basic knowledge as a rational guide for therapeutic measures. The general lack of knowledge concerning etiology and pathogenesis of periodontal disturbances may account for a touch of dogmatism in recommending treatment procedures. At the same time all accepted technics are presented without favoritism to any and without glowing promises of their effectiveness.

In the reviewer's opinion this text will be a valuable addition to the libraries of student and practitioner.

Sumter S. Arnim

ANALYSIS IN DENTAL RESEARCH

By Neal W. Chilton, D.D.S., M.P.H. 218 pages with 31 figures and 55 tables. Index. Price $3. Distributed by the Office of Technical Services, United States Department of Commerce, Washington, D. C., 1953.

The author's purpose is to stimulate wider utilization of statistical reasoning and methods by dental research workers. Two features about this book stand out preeminently. First, it includes only those methods which, in the author's wide experience as a teacher, clinician, and investigator, are most directly applicable to the planning and conduct of dental research. For this reason, the reader will look in vain for text treatment of such topics as secular trend and multiple correlation. Second, this book has facilitated the transition from the general statistical principle to its specific application in dental experimentation. This has been admirably accomplished by a presentation of numerous, competently worked-out examples from the dental literature.

These obvious virtues, however, cannot obscure a number of weaknesses which impair somewhat the over-all quality of the volume. The author has a tendency to speak loosely, and hence imprecisely, as when he refers to a "good or true sample." Does the experimenter ever know whether he has true samples.

The order of the material in many instances has compelled the author to introduce terms before he is ready to discuss their meaning. "Four-fold table" and "random numbers" appear without definition. Or again, the standard deviation is introduced by telling the reader how to perform its computation without prior presentation of the why, what and when of this statistical measure.

The subject of statistical significance is handled adequately, although one senses the lack of a clear distinction between a parameter and an estimate derived from a sample. Also, one might question the author's statement that an alternative hypothesis is required to reject the null hypothesis.

Some readers may be confused by the application of "normal curve theory" to a sample of 31 experimental and 15 control animals, when later confronted by the statement that the normal curve is not applicable to small samples. When should it or should it not be used? The text throughout fosters the impression that rather strong inferences can be drawn from small samples.

Barring these deficiencies, we have here a text which will undoubtedly prove useful to the dental researcher with a previous year of statistical training. For the beginner, *Analysis in Dental Research* is recommended as an adjunct to one of the more standard introductory texts.

Samuel Herman

TEN YEARS OF RESEARCH, 1943-1953

By the Sugar Research Foundation, Inc. 57 pages. Index. No price listed. New York, Sugar Research Foundation, 1953.

This report of research sponsored by the Sugar Research Foundation contains descriptions of 91 projects embodying 93 investigations of which 11 (12 per cent) are concerned with dental caries or with teeth. Of

more than one and one half million dollars appropriated by the Foundation for research during the first 10 years of its activity, $186,227.88 (12.30 per cent) was assigned to these dental projects. No grants for dental research were made in 1946, 1948, 1949 or 1952, and only one (for $2,000) is shown for 1953.

Although most of the grants were toward research into commercial aspects of sugar production and promotion, many others were made in the field of basic science, with little expectation that commercial benefits would accrue to the sugar industry from the results in the foreseeable future.

It is an indication of foresight within the Foundation that it appropriates funds for the advancement of scientific knowledge and the public welfare. It may be hoped that greater recognition of its responsibility in the matter of caries prevention will induce the Foundation to intensify fusther its efforts in the field of dentistry.

ANTIBIOTICS

By Robertson Pratt, Ph.D., and Jean Dufrenoy, D. Sci. Second edition. 414 pages with 87 illustrations, one in color. Index and appendix. Price $7.50. Philadelphia, J. B. Lippincott Co., 1953.

In view of the multitude of publications relating to antibiotics which are appearing currently in the scientific literature, it almost seems that no author would attempt to write a book on antibiotics. During the interval between completion of the manuscript and the appearance of the book in the market, hundreds of new articles on antibiotics will have appeared in the periodical literature, and some portions of the book are likely to be outdated.

Pratt and Dufrenoy have minimized this threat of obsolescence by stressing the technological, chemical and microbiologic aspects, which are fairly well defined in the case of most clinically useful antibiotics. They have devoted a relatively smaller, but significant, proportion of their discussion to the therapeutic and clinical phases.

Fourteen of the most important clinically useful antibiotics, including the relatively new drugs Erythromycin and Carbomycin, are discussed in detail. A brief chapter on dental applications is included.

A weakness from the point of view of the teacher or researcher is the lack of specific literature references to support certain positive statements in the text. However, omission of such references minimizes distraction.

The text is well written, readable, and authoritative. Time spent with it should be rewarding to dentists and students of dentistry.

Donald A. Wallace

SCHOOL HEALTH PROBLEMS

By Laurence B. Chenoweth, M.D., and Theodore K. Selkirk, M.D. Fourth edition. 444 pages with 83 illustrations, 37 graphs and 27 tables. Index. Price $4. New York, Appleton-Century-Crofts, Inc., 1953.

This is a fourth and considerably revised and enlarged edition of an accepted work. As indicated in the preface, "The purpose of this book is to acquaint students of education, teachers in service, and others . . . with the broad, general nature of health problems in schools." It is profusely illustrated and every chapter is followed by complete references. These bibliographies should prove very helpful to students seeking further information on specific subjects. There is also an excellent glossary at the close of the book which should prove helpful to a layman in interpreting some of the terms utilized.

This book is most useful as a textbook at the college level; however, there is some question in the reviewer's mind as to its practical use by a teacher who is not participating in a supervised course in school health.

This is not a book which should prove particularly useful in the library of a practicing dentist. The chapter on dental health needs some revising because of certain debatable statements as to the cause of dental caries and the rather heavy stress laid on the nutritional aspect. It does contain, however, information on the fluorides as a preventive measure. There are also some rather peculiar statements in regard to open caries causing tonsillar infections. With these exceptions the book should prove useful in classes on school health.

H. Shirley Dwyer

ANNUAL REPORT OF W. K. KELLOGG FOUNDATION FOR 1951-1952

154 pages with some illustrations. No price listed. Battle Creek, Mich., W. K. Kellogg Foundation, 1953.

The W. K. Kellogg Foundation, a philanthropic organization, was founded in 1930 by the man whose name it bears and who provided the endowment. He specified that the

funds be utilized "for the promotion of health, education and welfare of mankind." Headquarters of the Foundation is in Battle Creek, Michigan, the place where the founder made his fortune.

In the early days of its existence the Foundation confined its activities largely to the state of Michigan. In succeeding years its activities expanded to include most of the countries in the world. The larger percentage of its work is in the United States.

The W. K. Kellogg Foundation prepared an annual report in each of the years previous to 1951-1952, but this report is the first issue to be published and made available to the public.

That the founder endowed this organization with large sums of money is reflected in this report. During the fiscal year 1951-52 the Foundation spent over three million dollars and gave away property valued at almost $200,000. The total expenditures during the 22 years of its existence amounted to approximately 37 million dollars.

Of interest to dentists is the amount of funds spent by the Foundation for dentistry. This amounted to almost $2,800,000, or eight per cent of the total, for the 22 years. Most of this amount was spent to improve dental education.

F. C. Cady

SYNOPSIS OF PATHOLOGY

By W. A. D. Anderson. Third edition. 788 pages with 334 illustrations and 13 color plates. Price $8. St. Louis, C. V. Mosby Co., 1952.

This is a condensed edition of an acceptable text covering the subject of general pathology briefly. Its greatest virtue is its size, about 5 x 8 inches and weighing a little over two pounds; it is about one third the size of the unabridged volume.

In general the effect of condensation can be judged by comparing the same subject matter in this volume and in another supplying full coverage. For example, on congenital mouth malformations and anomalies the Anderson discussion is limited to one paragraph of nine lines and discusses only cleft palate and cleft lip. Thoma, in his *Oral Pathology*, not only devotes one whole chapter to the subject but also supplies additional material in other parts of this book.

The well-selected, generous and usually up-to-date bibliography found at the end of each chapter is of considerable help to those readers and students who may wish to supplement the text by referring to the original writers; this to a certain extent offsets the brevity of this text. For the most part these references are more than adequate, but it just happens that in the area of mouth malformations there are none.

The illustrations vary from adequate to excellent and the overall quality is high; all but one of the colored plates are borrowed, and 145 of the black and white illustrations are not originals. The type is large enough for easy reading, the style is attractive and the faces are varied to aid readers in the use of the book. The book is highly recommended wherever an abbreviated pathology text may find a place.

E. H. Hatton

MAN'S FOODS—NUTRITION AND ENVIRONMENTS IN FOOD GATHERING TIMES AND FOOD PRODUCING TIMES

By Lloyd B. Jensen, Ph.D. 278 pages. Index. Price $4.50. Champaign, Ill., The Garrard Press, 1953.

This book is packed with interesting information and scientific conjecture, spiced unexpectedly here and there by sly humor. It provides a survey of man's food from Paleolithic times to the present.

Jensen points up the broad and varied influences of nutrition; the role of diet on genetic variation, on physical development, health, mental processes and culture. He even discusses the influences of food on our way of life: "There has never been a democracy where there is a chronic lack of food! A starving man knows no reason and falls easy prey to the disruptive influences that have ever abounded in this world."

In two chapters the author refers to changes in the architecture of the face and skull. He notes that these have been brought about, broadly speaking, by nutrition and cookery, as well as by development of structure for the intricacies of speech and reduction in the use of jaws and teeth for fighting.

There are a few minor inaccuracies, but on the whole, statements are correct and well-documented with 21 pages of references. In fact, Jensen is apparently an omnivorous reader.

Anyone reading this book will be stimulated to think along many new channels and will be entertained pleasantly as well. Both the layman and scientifically trained will like this story of the varied ramifications of man's attempts to provide himself with food.

Dorothea F. Radusch

DIE GUSSFÜLLUNG (THE CAST FILLING)

By Ewald Harndt, Dr. Med. and Dr. Med. Dent. Fourth edition. 87 pages with 190 illustrations. Index. Price 8.80 German marks. Leipzig, Germany, Johann Ambrosius Barth, 1953.

The Cast Filling, volume 37 of the Meusser Collection of treatises on clinical dentistry, was written to supply students with a practical textbook on the laboratory preparation of the cast filling by the indirect method. The author states that he does not include a discussion of the direct method because it would require considerable space and that, furthermore, though many students are learning both methods, as yet the indirect method is more practical for the student in Germany.

From the first page to the last, the work is entirely practical. The first chapter deals with the advantages, disadvantages, indications and contraindications for the use of the cast filling. The next four chapters contain specific directions for the various steps in the preparation, making and adapting of the cast filling. Details in each step are clarified with profuse roentgenograms and excellent illustrations.

Perhaps as valuable as the directions for the technic are the cautions to the beginner. At each critical point in the procedure the author lists the common errors, their consequences and methods of avoiding them. The right way and the wrong way with the results are depicted in remarkably clear illustrations. The final chapter is merely a listing of the most frequent failures and their causes.

The fact that this volume is now in its revised and enlarged fourth edition is a proof that it has been found useful.

G. Nichols

THE DYNAMICS OF PSYCHOSOMATIC DENTISTRY

By Joseph S. Landa. 435 pages. Index. Price $8.75. Brooklyn, Dental Items of Interest Publishing Company, Inc., 1953.

There can be no question of the growing interest in the subject of psychosomatics and its importance as related to dental practice. Doctor Landa presents a mass of material gleaned from actual practice. Here is a textbook of profound logical deductions, replete with philosophical advice. It represents the action of a keen mind guided by sound judgment. The clear comprehensive presentation of the matter as contained in the text is the result of the long experience of a carefully thinking practitioner. In a lucid, easy-to-read manner the author champions the psychosomatic approach in the treatment of varied dental disorders.

Several well-known writers have contributed to this work. The author has arranged the chapters of this book in a very ingenious manner, blending the thoughts of different minds into a logical unison. The text is divided into 42 short chapters. It contains, besides a general index, a bibliography, a list of suggested readings and an index of proper names.

While one may approach this subject with an attitude of skepticism, this is soon dispelled, and one begins to feel that the book carries a definite message of importance to the dental profession, backed by considerable clinical experience. However, an evaluation of the real worth of the text will doubtless be ascertained when the author's suggestions are applied on a large scale by a greater number of dentists.

The undergraduate and postgraduate student, in common with the practitioners, cannot help but profit by a careful study of its contents. The book covers in a clear concise manner some important psychosomatic problems of every day practice.

Dr. Landa is to be complimented on this worthy contribution to dental literature. The physical aspects of the book are excellent, and its organization is beyond criticism.

E. Alan Lieban

SCHOOLS OF PUBLIC HEALTH

By Leonard Rosenfeld, Marjorie Gooch and Oscar H. Levine. Public Health Service Publication No. 276. 110 pages. Appendix. Price 35 cents. Washington, D. C., U. S. Government Printing Office, 1953.

The nine schools of public health in the United States provide special training for physicians, dentists, engineers, nurses, health educators and other smaller specialized groups. This training prepares them for work in official and voluntary agencies concerned with community health services.

Schools of public health have in common three basic functions—the training of students in public health sciences and public health practice, the conduct of research and participation in the improvement of community health services. A majority of the schools award a Master of Public Health degree after one year's training and the degree of Doctor of Public Health after two years' training, which includes a thesis on an original ex-

haustive study or research project in some phase of public health practice.

The object of this publication is to present a comprehensive description of schools of public health, their organization, programs and needs. It is planned that this detailed report, which is the first of its scope, will provide a basis for later evaluation of the progress in the education of public health personnel.

This report covers in detail such items as organization, administration, finance and staff, to list the most important.

The 49 comprehensive tables present in detail such items as course content, number and qualifications of faculty, number and type of students, source of income, salaries, facilities for research and annual budgets.

F. C. Cady

CHEMISTRY OF FOOD AND NUTRITION

By Henry C. Sherman. Eighth edition. 721 pages. Index and appendix. Price $6. New York, Macmillan Co., 1952.

This is the eighth edition of a book first published in 1911. Consistent effort to improve presentation and to incorporate recent advances in the principles of food chemistry and nutrition provides a book of more current value than is frequently true of books when contrasted to periodicals.

Some chapters required minor changes only, but other chapters have been quite fully rewritten. There is discussion of the currently popular subject, "Ideal Weights," in Chapter 10 on energy metabolism. Chapters 5 and 11 include the newer data on protein metabolism. A new chapter has been added on folic acid, vitamin B_{12}, and the citrovorum factors. The last chapter has been replaced by two chapters dealing respectively with trends of food consumption and improvement of already "normal" nutrition. References and suggested readings have been evaluated, some having been omitted and many recent ones added.

This is a book recommended for fuller understanding of the principles of nutrition and diet. Sherman has a way of using questions throughout the text to point up significant problems and to stimulate the reader to more careful analysis of the data. Certainly all dentists will be interested in Chapter 2, with its discussion of the many phases of influence brought about by the per capita increase in consumption of sugar. One question raised is: "Would we be better off if part of the producer's land and labor, and of the consumer's money, now devoted to sugar were devoted instead to increasing the production and consumption of foods which together with their calories furnish us also other nutrients needed to balance our dietary?"

The book presents a broader interpretation of the significance of the chemistry of food and nutrition than might be expected from the title. This increases the value of the volume, whether for the college student for whom it primarily was prepared or for others seeking understanding of this pertinent subject.

Dorothea F. Radusch

DIE GUTARTIGEN GEWÄCHSE DER MUNDHÖHLE

(BENIGN GROWTHS OF THE ORAL CAVITY)

By Hermann Mathis, M.D. 102 pages with 140 illustrations, 10 in color. Index. Price 9.20 German marks. Leipzig, Germany, J. A. Barth, 1953.

Mathis (Alexandria, Egypt) defines a benign growth as one being limited to its site of origin, in general of slow growth and damaging to its surrounding tissue by pressure displacement only. However, he warns that this definition has its shortcomings.

The author classifies the benign growths into two groups: those "growths with well-defined shape" and those with a "shape hard to define." The first group is divided into connective tissue growths and epithelial growths. In the former class belong the fibromas, lipoma, mixoma, chondroma and osteoma. In the latter are the papilloma, adenoma (cylindroma) and epithelioma (adenoides cysticum).

In the group of ill-defined tumors Mathis classifies ameloblastoma, odontomas, mixed tumors, neurogenic tumors, myeloblastoma (peculiarly enough the author seems to think that leiomyomas are identical with myeloblastomas), growths of vessel tissues (hemangioma, lymphangioma, endothelioma) and the "basaliom" which develops from the basal cell layer of the epithelium. According to Mathis, such tumors are not infrequent, especially on the palate.

At the end of the book there is a discussion of classification of tumors in general in which the author discusses the difficulties encountered in differentiating benign and malignant tumors, quoting Rössle who tried classifying tumors into stages of development rather than considering only the appearance at a given time.

This small booklet is well illustrated by clinical as well as histopathologic pictures.

B. Orban

Current Literature

BACTERIOLOGICAL INVESTIGATIONS ON DENTAL FILLING MATERIALS

H. J. Turkheim. Brit. D. J. 95:1 July 7, 1953.

The bactericidal properties of selected dental materials were tested in a preliminary series of *in vitro* experiments. Dental cements, amalgams, metals and acrylic resins were brought in contact on agar plates with bacterial test strains obtained from the National Collection of Type Cultures. Some strains were cultivated from carious lesions and some from infected root canals.

Zinc oxide-eugenol cement appeared to have relatively long-lasting germicidal effects, with evidence that bacterial sensitivity increased directly with the age of the organism. Most of the materials tested, however, exhibited bactericidal activity only during the setting period. This activity lessened or ceased toward completion of the setting process.

Silver and copper amalgam produced large free zones on the agar plates. The latter was especially potent except in relation to *Monilia albicans*. Copper cements proved potent at the first plating, with subsequent loss of effectiveness after a few transfers. Of the various copper salts added to germicidal copper cements, copper silicate proved to have the most powerful antiseptic effect, copper iodide the weakest.

Cast silver wire demonstrated stronger oligodynamic effects than the manufactured product. Cadmium, however, exceeded silver in respect to oligodynamic property. Experiments with gold proved inconclusive. The quick-setting, self-curing acrylic resins were bacteriologically inert, except in those instances where metal powders (silver amalgam, cadmium) were added before setting.

TIME OF ERUPTION OF PERMANENT TEETH IN BRITISH CHILDREN IN 1947-48

E. M. B. Clements, E. Davies-Thomas and Kathleen G. Pickett. Brit. M. J. 1421 June 27, 1953.

This paper is based on the analysis of dental observations made during the course of the Birmingham anthropometric survey of 1,427 boys and 1,365 girls, ranging in age from 5 to 13 years, drawn from 87 infant, junior and secondary modern schools and unselected but representing all types of areas in the city of Birmingham. One person conducted all the examinations. A tooth was classified as erupted as soon as the gingiva was pierced.

The statistical analysis was made by the Probite method. The computations were based on the observed probabilities of the eruption of the teeth at various ages. The technic employed was that used by Black in 1950; the coefficients were corrected for the effects of grouping by the technic used by Tocher in 1949. Tests of significance were made with a "t" test.

The results in summary were as follows:

There is a tendency for the mean times of eruption of teeth of children who are either of a superior socioeconomic group or are pubescent to be earlier than those of other children.

The mean times of eruption of the corresponding right and left teeth do not differ significantly in either the upper or the lower jaws.

The mean times of eruption of the teeth of boys are, with the exception of the upper first permanent molar teeth, later than those of girls.

The mean times of eruption of teeth in the upper jaw are later than those in the lower jaw, with the exception of the first bicuspid and second bicuspid teeth, for which the times are earlier, and of the first molar teeth, for which the times do not differ significantly.

The order of eruption of the teeth determined from mean eruption times is the same, within the limits of sampling variation, as that observed in other stocks of European origin.

ORDER OF ERUPTION OF THE PERMANENT HUMAN DENTITION

E. M. B. Clements, E. Davies-Thomas and Kathleen G. Pickett. Brit. M. J. 1425 June 27, 1953.

The data on tooth eruption collected in the Birmingham anthropometric survey of 1953 were examined to determine whether the order of eruption of teeth which have their mean eruption times close together is constant and, if variation occurs, to estimate the probability of different patterns of eruption time. The order of eruption of the central incisors and the first permanent molar was examined in 644 boys and 633 girls aged 5 to 9 years. The records of the cuspid, first bicuspid, the second bicuspid and the second permanent molars were sorted in a similar way for 1,135 boys and 1,077 girls from 7 to 14 years old. Data were analyzed separately for the upper and lower

jaws and for the right and left segments. In summary the results were as follows:

In the order in which the central incisor and molar teeth and the cuspid, first bicuspid, second bicuspid and second molar teeth erupt in British children, considerable variations were found in both the upper and the lower jaws.

The most frequent order of eruption was found to be the first molar tooth followed by the central incisor tooth and the first bicuspid tooth, followed in succession by the cuspid, second bicuspid and second molar teeth in the upper jaw and in the lower jaw the central incisor tooth followed by the first molar tooth and the cuspid, first bicuspid, second molar and second bicuspid teeth in that order.

The analysis indicates that the times of eruption of teeth with similar mean eruption times on the same side are independent of each other but that the eruption times of corresponding teeth on the right and left sides are correlated.

MEDICAL ASPECTS OF MALOCCLUSION

Hugh R. E. Wallis. D. Record 73:519 June 1953.

This investigation, which was started in Bristol, was an endeavor to find out how postnormal occlusion is caused and how it is connected with general health, enlarged tonsils and adenoids, chest diseases and deformities, and faulty posture and sucking habits.

Fifty children with postnormal occlusion were compared with 52 children with normal occlusion. As a result of the investigation it was concluded that:

1. The hereditary factor is of great importance.
2. A low birth weight, indicating a degree of prematurity, is associated with postnormal occlusion.
3. Artificial feeding is more common in children with postnormal occlusion.
4. Sucking habits have a strong influence on the development of malocclusion.
5. The removal of tonsils and adenoids is closely connected with postnormal occlusion.
6. Asthma is associated with malocclusion.
7. Children and university students with postnormal occlusion are taller than average.
8. Minor disabilities are significantly more common among university students with postnormal occlusion.
9. It is suggested that postnormal occlusion is associated with a general biological inferiority.

William F. Ford

JOURNAL OF ORAL SURGERY
July 1953

APPLIED SURGICAL ANATOMY OF THE OROFACIAL REGION

Max H. Jacobs, p. 185.

Some of the problems of surgical intervention are the mechanical complications arising during the extraction of teeth, the selection of the intraoral approach for the removal of submaxillary and sublingual salivary calculi, the establishment of adequate drainage in the fascial spaces of the neck after serious odontogenic infections, and the determination of the routes of metastatic cervical gland involvement in malignancies of the oral cavity.

The oral surgeon is concerned with possible involvement of the cavernous sinus, to which infection may spread through at least two principal routes: the anterior facial vein and the pterygoid plexus.

The surgical anatomy of the sublingual space must be considered in the treatment of conditions such as infections from the jaws and teeth, cysts and tumors of the sublingual gland and the upper lobe of the submaxillary gland, salivary calculi within these glands or their ducts, and accidental luxation of teeth or roots into the space.

As the mylohyoid ridge approaches the cuspid region, its position on the mandible curves toward the inferior border. Thus, the roots of the posterior teeth may be above or below the ridge, whereas the bicuspid and cuspid roots are almost always above the ridge. If an impacted mandibular third molar has been pushed through the lingual plate, if the mylohyoid ridge is high and if the tooth lies in the submaxillary triangle, it is necessary to strip the attachment of the mylohyoid muscle from the ridge in order to remove the tooth without causing hemorrhage and injury to the underlying structures.

Abnormally large, long and fused mental spines (geniotubercles) create difficulty in denture construction, especially when the mandible has atrophied considerably. Surgical excision of the spines may become necessary.

The plica sublingualis, an important landmark, lies over the anterior portion of the submaxillary (Wharton) duct. Lipomas, cysts and mixed cell tumors within the sublingual space are not uncommon. The primary line of incision for their removal is important.

Cysts in the floor of the mouth are of three types: those which arise within the mucous glands, those which arise within the salivary glands or their ducts, and those which arise within the connective tissue of the sublingual space.

The suprahyoid triangle is regarded as the safe triangle of the neck since no important structures are within this region. The sublingual space is not a single space but consists of three spaces, two superior spaces lying between the oral mucosa and the geniohyoid muscles and separated from each other by the genioglossus muscles and one inferior space lying between the geniohyoid muscles and the mylohyoid muscles.

A knowledge of the relation of the anatomic structures within the pterygomandibular space is important to secure anesthesia of the inferior alveolar nerve for: (1) resection of this nerve and the lingual nerve, (2) removal of broken needles and (3) ligation of the inferior alveolar blood vessels in case of aneurysm or cavernous hemangioma of the mandible.

The pterygomandibular space is important from the standpoint of such infections as acute pericoronitis, infection secondary to injection, infections of hematomas and infection following extraction of a mandibular third molar.

There are certain nodes which are of special interest to the oral surgeon. The gland of Stahr often becomes palpable after infections of the mandible or the teeth and remains so.

Infections from the mouth, sinuses and throat may reach and involve the pharyngomaxillary space. There is a direct connection between the pharyngomaxillary space and the pterygomandibular space.

PENTOBARBITAL SODIUM: APPRAISAL OF ITS USE IN ORAL SURGERY

John T. Kelleher and James B. Griffin, p. 199.

There is no average dose of pentobarbital sodium. It must be administered slowly, at approximately the rate of 1 cc. per minute, and it must be remembered that the greatest depression occurs about ten minutes after the drug has been injected. It has been estimated that approximately 50 to 70 per cent of the lethal dose of this barbiturate is necessary to produce complete anesthesia; and since the degree of intravenous anesthesia is difficult to control generally, this drug is not recommended when complete anesthesia is desired. Generally the administration of 2 to 3 cc. is sufficient. The intravenous injection is discontinued when the patient becomes drowsy. Then the nitrous oxide-oxygen anesthetic is administered in the routine manner.

With patients for whom a general anesthetic is contraindicated or with highly apprehensive individuals who desire a local anesthetic, this solution is effective when given in conjunction with a local anesthetic. The anesthetic usually is injected first; and in the period required for it to become effective, the intravenous injection is started. Extremely apprehensive individuals necessarily require more premedication than do the calmer patients. The nervous patient is more likely to be given an overdose. This overdose results in extreme depression which requires an extremely long recovery time. Because of the depressant effect of the drug, blood pressure may be lowered temporarily.

LOCALIZED OSTEITIS FIBROSA AND CEMENTOMA

Andrew F. Catania, p. 202.

Localized osteitis fibrosa is a disease of unknown etiology. It is characterized by resorption of bone trabeculae, which is followed by fibrosis of the bone marrow and spongiosa. It is a slow-growing, painless tumor which transforms the architecture of the bone, usually producing a small swelling. The disease differs from generalized osteitis fibrosa cystica (Recklinghausen's disease, hyperparathyroidism). There is no withdrawal of calcium from the bones, no hypercalcemia, no undue excretion of calcium in the urine, no lowering of the serum phosphorus and no elevation of phosphatase. The lesion is not of dental origin.

Cementoma is a lesion that has some of the characteristics of localized osteitis fibrosa, thus the term "periapical osteofibrosis." It presents no clinical symptoms since the teeth remain vital. The actual etiology is unknown; however, trauma succeeded by intraosseous hemorrhage is the most generally accepted hypothesis. Cementoma produces no abnormal hematological findings.

All the synonyms for localized osteitis fibrosa are the result of the varied appearance and changeable proportion of soft and hard tissues. Thoma classifies the conditions into three types: central ossifying fibroma, fibro-osteoma and fibro-osteoid-osteoma. To make explicit suppositions regarding histologic differences between fibrous dysplasia and ossifying fibroma is not easy. The resemblance is so close that eminent investigators find it almost impossible to distinguish between them.

EXODONTIC PROBLEMS

James R. Hayward, p. 208.

Most oral surgeons will admit that complications in exodontics arise from omissions and errors. Prevention of the major sources of

trouble may be achieved by the following: first, a sound diagnosis and appraisal of the patient; second, an effective treatment plan based on care and surgical principles; and third, a diligent postoperative management.

The first important decision is the selection of the anesthetic. No anesthetic can be administered safely and successfully to all patients; the agent must be adapted to the needs of the individual and his problem. Profound and effective anesthesia is a prerequisite for all successful extractions.

The oral surgeon's efforts are wisely directed to prevention of cross and exogenous infections by a rigid sterilization routine. The true bleeding tendency must be identified by a laboratory differential diagnosis. Extreme care with transfusions and utilization of hospital facilities are, of course, the rule. Clear vision is essential.

If there is any single principle in tooth removal, it is controlled force. No resistance of the tooth during extraction calls for or justifies excessive force. Tooth sectioning and relief of impinging bone are the cardinal principles of controlled force.

Management of impacted teeth is dictated by their exact position and by their relations to surrounding bone, adjacent teeth and vulnerable zones of anatomy. One of the major advances in impaction removal has been the conservation of the alveolar process and the reduction of trauma through tooth sectioning.

Preparation of a mouth for dentures requires satisfactory contouring of the extraction site. Soft tissue surgery in exodontics calls for plastic surgery technic to remove excesses of gingival tissue and frena and to adjust muscle attachments.

Just as preoperative mental preparation of a patient can be helpful, so an understanding of the postoperative course together with definite instructions will prevent complications. If antibiotic agents are used early and in massive doses, an infection can be aborted and deep tissue abscesses can be prevented.

Additional complications are involvement of the maxillary sinus and dry socket. First emphasis, naturally, is on prevention of these complications. For dry socket, the rational treatment is conservative and should promote comfort while encouraging repair. Strong caustics and curettage are ill-advised. To make the obtundent dressing effective, the socket should be irrigated gently, cleansed of debris and dried before the dressing is inserted. Careful postoperative treatment is essential.

No single instrument or expedient technic can be depended on to simplify the problems of exodontics.

CARDIAC ARREST

Dan E. Brannin, p. 216.

Hypoxia or anoxia is the common denominator in all cases of cardiac arrest. Thus, the administration of any anesthetic agent at the expense of adequate oxygenation of the patient is to be deprecated. The causes of cardiac arrest may be divided into three broad groups:

1. Ventricular fibrillation. The injection of epinephrine in a patient under cyclopropane, chloroform or ethyl chloride anesthesia frequently produces ventricular fibrillation.

2. Reflex stimulation. Reflex stimulation of the vagus nerve may occur when a patient is intubated while under too light a plane of anesthesia, during manipulations in the pharynx or after pressure on the carotid sinus.

3. Myocardial ischemia. Coronary occlusion, myocardial depression from toxic drugs such as occurs in cases of anesthetic overdose, and drug idiosyncrasies are examples of myocardial ischemia.

In diagnosis the most evident signs must be sought. These signs are apnea, imperceptible pulse, imperceptible blood pressure and inaudible heart sounds. When cardiac arrest occurs, treatment must be instituted without hesitation. The administration of oxygen through a clear airway and the simultaneous institution of cardiac massage are the two prime essentials of adequate therapy. Electrical defibrillation usually is necessary in cases of ventricular fibrillation, although procaine injected into the cardiac chambers and pericardial sac may be effective. Small amounts of very dilute epinephrine solution may be injected in cases of cardiac standstill, but the use of this drug is contraindicated in cases of ventricular fibrillation.

USE OF TRICHLOROETHYLENE AND THIAMYLAL SODIUM AS ADJUNCTS TO OTHER ANESTHETICS IN ORAL SURGERY

Fred W. Clement and Harry M. Seldin, p. 220.

Trichloroethylene resembles chloroform in its action but is less potent and only slightly toxic. Trichloroethylene vapor when inhaled produces excellent analgesia rapidly without any serious side reactions. The advantages of trichloroethylene are as follows: (1) Both absorption and excretion are rapid. (2) The odor is not unpleasant. (3) The drug is nonirritating and does not cause excessive salivation or mucus. (4) Nausea is uncommon. (5) The drug is nonexplosive and noninflammable at ordinary temperatures and pressures.

(6) It is inexpensive. (7) It does not cause any liver or kidney damage.

Thiamylal sodium is useful as an induction agent for nitrous oxide-oxygen and as an adjunct to nitrous oxide-oxygen in prolonged anesthesia. Its potency is about 1.5 times that of thiopental sodium. The advantages in its use are: (1) It has a shorter pharmacologic action and a lesser cumulative effect than does thiopental sodium. (2) It causes less postanesthetic depression. (3) Laryngospasm is rare. (4) According to the statement of Wyngaarden and his associates in a study of the cardiotoxic effect of thiobarbiturates, in equivalent doses it is somewhat less toxic than thiopental sodium. (5) Recovery is rapid. (6) Nausea and other undesirable postanesthetic reactions are infrequent. (7) Induction is rapid, smooth and pleasant.

In prolonged oral surgical procedures for the normal and for the debilitated patient, an intravenous infusion of a 0.4 per cent solution of thiamylal sodium as an adjunct followed by nitrous oxide-oxygen produces a balanced anesthesia that is safe and an induction that is pleasant.

Barbiturates have practically no analgesic action. In heavy doses, they act as respiratory depressants and may produce respiratory failure. The so-called ultra-short-acting barbiturates produce anesthesia of short duration only when administered in small doses. In prolonged anesthesia when repeated injections are made, they no longer behave as ultra-short-acting drugs. Repeated fractional doses become cumulative. The drug metabolizes slowly at the rate of 10 to 15 per cent per hour. Fat stores up to 70 per cent of the administered dose and achieves a concentration of 6 to 12 times that of plasma. After large doses the patient, especially the very old or the very young, is in danger of severe depression.

A satisfactory method is to use the minimum dose of the thiobarbiturate by dilute intravenous drip and to discontinue the flow soon after induction. The anesthesia is continued with nitrous oxide-oxygen. The patient is less depressed and becomes ambulatory more quickly if the barbiturate is kept at a low plasma level and if the maintenance of anesthesia is controlled by the nitrous oxide-oxygen.

THE USE OF ANTIHISTAMINES IN ORAL SURGERY: A PRELIMINARY REPORT

Roland E. Silverman, p. 231.

Many postanesthetic complications parallel the symptoms produced by histamine intoxication. Histamine release after trauma is by now a fairly well-established fact.

When the antihistamines are administered, the most important actions of histamine are consistently blocked; namely, the spasm of smooth muscle, increased capillary permeability and dilatation of blood vessels. The antihistamines appear ideally suited for the specific control of those clinical conditions suspected of being caused by histamine.

A considerable reduction in postoperative complications is noted in cases where antihistamines are used. After trials with numerous drugs, it was established that the antihistamines Pyronil and Co-Pyronil are best suited for postoperative use. It was finally established that the optimum dose involved the use of the drug every four hours. The frequency of administration, however, was reduced to one capsule ever 8 to 12 hours for usually four to six doses.

Outstanding in the observations was the absence of slough. Pain, swelling, bleeding and trismus appeared substantially diminished. Healing by first intention occurred more frequently. When wounds healed by second intention, pain rarely was present, and these wounds were untreated except in impaction areas. Dry sockets of long standing responded quickly to the drugs, with irrigation the only local treatment necessary.

Deaths

Abbay, Minor A., Richmond, Calif.; College of Dentistry, University of California, 1930; died October 3; aged 46.

Abrahams, Elias, New York; College of Dentistry, New York University, 1932; died October 7; aged 46.

Adler, Raymond M., New York; New York College of Dentistry, 1915; died September 22; aged 64.

Altemus, Charles E., Strongstown, Pa.; Baltimore College of Dental Surgery, University of Maryland, 1891; died August 26; aged 90.

Beesley, Maurice E., Belvidere, N. J.; Pennsylvania College of Dental Surgery, Philadelphia, 1907; died September 6; aged 71.

Black, Howard V., North Vernon, Ind.; Louisville College of Dentistry of Centre College, 1907; died August 22; aged 68.

Bouck, Douglas M., Grand Ledge, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1909; died September 26.

Bowman, James L., Gillespie, Ill.; School of Dentistry, Washington University, St. Louis, 1918; died August 23; aged 74.

Boyer, Frank G., Kansas City, Mo.; Western Dental College, Kansas City, 1900; died September 18.

Brooks, Richard B., Alexandria, La.; Southern Dental College, Atlanta, 1903; died August 28; aged 72.

Brown, Homer C., Columbus, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1890; died November 7; aged 84.

Buchanan, Frank J., Waterbury, Conn.; Philadelphia Dental College, 1904; died September 25; aged 75.

Bull, Terry P., San Francisco; Department of Dentistry, Starling-Ohio Medical College, 1912; died October 13; aged 65.

Burford, Wilson N., Columbia, Mo.; School of Dentistry, St. Louis University, 1938; died August 27; aged 40.

Burrill, James A., Wilmette, Ill.; College of Dental Surgery, University of Michigan, 1905; died October 11; aged 76.

Butler, Edgar, Minden, La.; School of Dentistry, Vanderbilt University, 1909; died September 6; aged 65.

Butts, James F., Charleston, W. Va.; Baltimore College of Dental Surgery, 1891; died July 12.

Carrothers, Frank, Hastings, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1897; died September 1; aged 80.

Chandler, Robert A., New London, Conn.; School of Dentistry, Temple University, 1924; died August 29; aged 52.

Clark, John J., New York; Pennsylvania College of Dental Surgery, Philadelphia, 1905; died September 18; aged 73.

Connor, Louis J., Dushore, Pa.; died September 26; aged 55.

Conway, Arnold A., Thorsby, Ala.; Atlanta Dental College, 1913; died July 16; aged 66.

Couch, Lester C., Elkin, N. C.; Baltimore College of Dental Surgery, 1912; died September 3.

Cox, Clarence E., Fairfax, Mo.; Kansas City Dental College, 1904; died July 11.

Cox, Marcus H., Grand Rapids, Mich.; Dental School, Northwestern University, 1896; died October 3; aged 89.

Crew, Thomas J., Sharon, Wis.; Dental School, Northwestern University, 1910; died September 8; aged 75.

Croessmann, June W., Duquoin, Ill.; Dental School, Northwestern University, 1912; died October 13, aged 65.

Dansereau, Albin P., Covington, La.; School of Dentistry, Loyola University, New Orleans, 1917; died September 9; aged 58.

Darrah, Charles H., Wilmington, Del.; School of Dentistry, University of Pennsylvania, 1914; died September 26; aged 64.

Davis, Floyd J., Chillicothe, Mo.; Kansas City-Western Dental College, 1920; died August 10.

Dobson, Francis K., New Britain, Conn.; Baltimore College of Dental Surgery, 1920; died September 19.

Eberhart, John C., Shelbyville, Ind.; Indiana Dental College, 1897; died September 15; aged 89.

Eddy, Paul G., Durham, N. C.; Indiana Dental College, 1900; died September 18; aged 77.

Elliott, Clarence A., Newport Beach, Calif.; College of Dentistry, University of Southern California, 1928; died September 3; aged 56.

Erlitz, Perry D., Brooklyn; College of Dentistry, University of Illinois, 1938; died September 27; aged 39.

Evedon, Joseph O., Hollywood, Calif.; College of Dentistry, New York University, 1911; died September 17; aged 63.

Ewing, Clyde D., Lawton, Mich.; Dental School, Northwestern University, 1915; died October 2; aged 64.

Fansler, George D., Logansport, Ind.; Indiana Dental College, 1919; died October 13; aged 68.

Farnum, Joseph E., Providence, R. I.; Dental School, Harvard University, 1906; died September 14; aged 70.

Farrington, Linwood H., Lowell, Mass.; Dental School, Harvard University, 1927; died in October; aged 52.

Feuer, David C., New York; died September 24; aged 52.

Fiedelbaum, Benjamin, New York; School of Dentistry, University of Pennsylvania, 1916; died July 4; aged 58.

Fink, Clarence C., Bradford, Ohio; College of Dentistry, Ohio State University, 1915; died July 11.

Finlayson, John M., Detroit; Department of Dental Surgery, Detroit College of Medicine, 1908; died September 8; aged 69.

Frazier, Allen E., High Point, N. C.; School of Dentistry, Vanderbilt University, 1891; died September 6; aged 86.

Fuxa, Edward C., Omaha; College of Dentistry, Creighton University, 1931; died August 4; aged 46.

Gasper, Edith O., Parma, Idaho; died July 26; aged 67.

Gatusky, Charles R., Ashley, Pa.; School of Dentistry, Georgetown University, 1931; died October 6; aged 48.

Gilbert, Adrian J., Stockton, Calif.; died October 10.

Glucksman, Benjamin, New York; New York College of Dentistry, 1914; died September 11; aged 61.

Glugla, Paul J., Detroit; College of Dental Surgery, University of Michigan, 1917; died September 24; aged 64.

Goldman, Benjamin, Chicago; Chicago College of Dental Surgery, Loyola University, 1921; died September 27; aged 63.

Gossett, James R., Temple, Okla.; St. Louis Dental College, 1907; died July 10; aged 72.

Gothers, John L., Westerly, R. I.; Baltimore College of Dental Surgery, University of Maryland, 1933; died October 11; aged 54.

Gray, Ernest R., Oyster Bay, N. Y.; New York Dental School, 1900; died August 10; aged 75.

Griffin, John J., Jamaica, N. Y.; School of Dentistry, Georgetown University, 1904; died September 23; aged 78.

Grubb, George A., Lincoln, Neb.; College of Dentistry, University of Nebraska, 1912; died November 1; aged 73.

Hayes, Louis V., New York; Baltimore College of Dental Surgery, University of Maryland, 1918; died October 5; aged 62.

Hetherington, Marion L., Winfield, Kan.; Kansas City-Western Dental College, 1925; died September 27; aged 55.

Hinkley, Clayton M., Waynesville, N. C.; School of Dentistry, University of Louisville, 1931; died July 15; aged 47.

Hockaday, William B., Brownsville, Texas; School of Dentistry, University of Texas, 1947; died September 15; aged 33.

Hoffa, Earl E., Terre Haute, Ind.; Indiana Dental College, 1918; died September 6; aged 71.

Hook, Arthur J., Fresno, Calif.; College of Dentistry, University of Southern California, 1918; died September 30; aged 58.

Howell, Henry R., Jefferson, Ga.; Atlanta-Southern Dental College, 1920; died August 27; aged 57.

Huntley, Roy M., Orlando, Fla.; Atlanta Dental College, 1907; died July 4; aged 69.

Hurd, Charles E., Robbinsdale, Minn.; Dental School, Marquette University, 1912; died September 4; aged 67.

Hurlong, Herman P., Arden, Del.; School of Dentistry, University of Pennsylvania, 1903; died September 24; aged 73.

Jansen, Henry E., Salinas, Calif.; College of Dentistry, University of California, 1929; died October 8.

Jenkins, William T., Martinsburg, W. Va.; Baltimore College of Dental Surgery, University of Maryland, 1914; died September 12.

Kearfott, Joseph G., Jr., Front Royal, Va.; Baltimore College of Dental Surgery, University of Maryland, 1924; died September 15; aged 51.

Keener, Charles E., Marion, Ind.; Indiana Dental College, 1911; died September 15; aged 63.

Kelly, Shields M., Laceyville, Pa.; School of Dentistry, University of Pittsburgh, 1928; died September 29; aged 52.

Kerrigan, Joseph P., Boston; Dental School, Tufts College, 1906; died September 20; aged 69.

Keyser, Dixon B., Chicago; Dental School, Northwestern University, 1907; died October 6; aged 76.

Kimmel, Philip R., Oceanside, N. Y.; Dental School, Tufts College, 1948; died September 3; aged 27.

Kirkpatrick, O. Adolphus, Denver; St. Louis Dental College, 1908; died September 14.

Knapp, Miland A., Minneapolis; College of Dentistry, University of Minnesota, 1892; died August 17; aged 85.

Kolb, Conrad L., Phoebus, Va.; Dental School, Marquette University, 1918; died October 4; aged 59.

Laing, Harold B. R.; New York; School of Dentistry, University of Pennsylvania, 1900; died October 6; aged 74.

Langner, Edward, New York; died September 16.

Levin, Morris J., Chicago; School of Dentistry, University of Buffalo, 1919; died October 29; aged 56.

Light, George P., San Diego; Chicago College of Dental Surgery, Loyola University, 1903; died September 14; aged 79.

Louis, D. D.; Boston; Dental Department, Meharry Medical College, 1923; died October 4; aged 55.

Ludlow, William B., Berkeley, Calif.; College of Dentistry, University of California, 1895; died September 24; aged 81.

Madden, Clare K., Greenwich, Conn.; College of Dental Surgery, University of Michigan, 1923; died September 17; aged 53.

Magill, Milo P., Los Angeles; College of Dentistry, University of Southern California, 1930; died September 26.

Mann, Benjamin F., St. Joseph, Mo.; School of Dentistry, Washington University, St. Louis, 1916; died September 2; aged 67.

Matter, Stephen H., Pasadena, Calif.; Chicago College of Dental Surgery, Loyola University, 1901; died August 28; aged 81.

Mayo, Kenneth W., Houston, Texas; Texas Dental College, Houston, 1914; died October 17; aged 63.

McCarty, William D., San Antonio, Texas; Ohio College of Dental Surgery, University of Cincinnati, 1900; died September 28; aged 74.

McCormick, James R., Xenia, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1900; died September 29; aged 85.

McFate, Thomas J., New Castle, Pa.; School of Dentistry, University of Pittsburgh, 1916; died September 22; aged 61.

McKnight, Alves E., Chicago; Dental School, Northwestern University, 1914; died October 6; aged 63.

McKnight, Roy H., Beaumont, Texas; School of Dentistry, Vanderbilt University, 1924; died July 4; aged 53.

McWilliams, Thomas P., Scranton, Pa.; School of Dentistry, University of Pennsylvania, 1917; died October 3; aged 60.

Mims, Zollie C., Atmore, Ala.; College of Dental Surgery, University of Memphis, 1910; died September 22; aged 67.

Mitchell, Clyde L., Trafford, Pa.; School of Dentistry, University of Pittsburgh, 1919; died October 13.

Murdoch, Herbert S., Springer, N. M.; Dental Department, George Washington University, 1908; died June 30; aged 72.

Newby, Grant W., Winter Park, Fla.; Dental School, Northwestern University, 1916; died September 28; aged 58.

Nowland, William F., Rehoboth Beach, Del.; Dental School, Harvard University, 1934; died July 14; aged 44.

O'Brien, Robert F., South Pasadena, Calif.; College of Dentistry, University of Southern California, 1917; died October 19.

O'Dell, Charles, Chicago; Chicago College of Dental Surgery, Loyola University, 1891; died July 1.

Olsson, Walter R., Worcester, Mass.; School of Dentistry, Temple University, 1915; died October 14; aged 61.

Parker, Lester, Sandwich, Mass.; Dental School, Tufts College, 1901; died September 3; aged 77.

Parks, Ruth H., Moline, Ill.; Dental School, Northwestern University, 1917; died August 15; aged 61.

Pfouts, David F., Dresden, Ohio; died July 17; aged 92.

Phillips, James C., Asheville, N. C.; School of Dentistry, University of Louisville, 1940; died August 30; aged 37.

Popkin, Nathaniel R., Trenton, N. J.; School of Dentistry, University of Pennsylvania, 1921; died October 4; aged 53.

Price, Clarence D., Minneapolis; College of Dentistry, University of Minnesota, 1914; died September 1; aged 66.

Reed, August, Waterbury, Conn.; died August 27.

Reilly, Charles J., Jackson, Mich.; College of Dental Surgery, University of Michigan, 1906; died October 4; aged 76.

Richman, Walter C., Manasquan, N. J.; Pennsylvania College of Dental Surgery, Philadelphia, 1899; died September 21; aged 76.

Roblyer, William W., Wichita, Kan.; died July 24; aged 78.

Rooney, Thomas C., Binghamton, N. Y.; School of Dentistry, University of Buffalo, 1926; died July 19; aged 52.

Rowe, Horace D., San Jose, Calif.; College of Dentistry, University of Iowa, 1916; died August 1; aged 61.

Rudd, Ed H., Sweetwater, Texas; Chicago College of Dental Surgery, Loyola University, 1901; died September 12; aged 73.

Sanchez, William G., Coral Gables, Fla.; Atlanta Dental College, 1913; died October 28; aged 61.

Sass, Alexander E., West New Brighton, N. Y.; School of Dentistry, University of Pennsylvania, 1927; died October 9; aged 49.

Satine, Bernard A., Orlando, Fla.; School of Dentistry, Temple University, 1942; died August 27; aged 36.

Saville, Carleton M., North Andover, Mass.; Dental School, Tufts College, 1900; died October 5; aged 75.

Schlag, Orlo C., Pittsburgh; Pittsburgh Dental College, Western University of Pennsylvania, 1906; died July 6; aged 77.

Schriber, Lester E., Everett, Mass.; Dental School, Tufts College, 1923; died September 15; aged 58.

Sefton, Edgar B., Hagerstown, Md.; Baltimore College of Dental Surgery, 1899; died September 7; aged 81.

Seifert, Frederick J., San Francisco; College of Dentistry, University of California, 1901; died October 11; aged 73.

Setzler, John H., Fort Collins, Colo.; College of Dental Surgery, University of Michigan, 1898; died April 5; aged 82.

Shaw, Theron S., Toledo, Ohio; College of Dental Surgery, University of Michigan, 1911; died October 16; aged 68.

Shea, Bernard F., Stony Brook, N. Y.; College of Dental & Oral Surgery, New York, 1905; died August 8.

Shuttleworth, Henry L., Rye, N. Y.; Dental School, Harvard University, 1926; died October 13.

Smith, Haydon A., Dearborn, Mich.; College of Dental Surgery, University of Michigan, 1919; died July 12; aged 57.

Smyth, George C., Quincy, Mass.; Dental School, Harvard University, 1916; died August 27.

Somerset, Charles W., New Haven, Conn.; School of Dentistry, University of Pennsylvania, 1903; died September 5; aged 76.

Spears, Avery M., Houston, Texas; School of Dentistry, Loyola University, New Orleans, 1932; died October 19; aged 45.

Squires, William A., New York; Dental School, Northwestern University, 1907; died July 9.

Steiner, Allen N., Bangor, Wis.; Dental School, Northwestern University, 1916; died July 28; aged 61.

Stewart, Charles A., Rouses Point, N. Y.; School of Dentistry, University of New York, 1896; died July 6; aged 84.

Stibolt, John P., San Diego; died October 6.

Stiff, Earl B., Tappahannock, Va.; School of Dentistry, Medical College of Virginia, 1912; died September 4; aged 64.

Stoner, Wilfred M., Adrian, Mich.; Chicago College of Dental Surgery, Loyola University, 1906; died July 12; aged 70.

Strubbe, Maurice J., Miami, Fla.; Chicago College of Dental Surgery, Loyola University, 1909; died in November; aged 65.

Sunderland, Egbert, Arcadia, Calif.; College of Dentistry, University of Southern California, 1911; died September 18; aged 74.

Tell, Julius L., New York; School of Dental & Oral Surgery, Columbia University, 1910; died August 24; aged 84.

Thompson, Oscar W., Pikeville, Ky.; Louisville College of Dentistry of Centre College, 1915; died October 12; aged 60.

Trombley, John E., Lorain, Ohio; Chicago College of Dental Surgery, Loyola University, 1895; died June 1; aged 83.

Trude, Mark W., Chicago; Chicago College of Dental Surgery, Loyola University, 1896; died October 25; aged 82.

Tunnicliffe, Edmund H., Boston; Dental School, Tufts College, 1906; died August 31; aged 74.

Turner, U. G., Jacksonville, Fla.; Southern Dental College, Atlanta, 1907; died September 22.

Van Buskirk, Earl J., Aurora, Ill.; Chicago College of Dental Surgery, Loyola University, 1904; died September 17; aged 71.

Van Deusen, Harry M., Arlington Heights, Ill.; Dental School, Northwestern University, 1904; died October 25; aged 73.

Wall, Alford C., Honolulu, T. H.; Baltimore College of Dental Surgery, University of Maryland, 1896; died June 4; aged 80.

Walp, Walter A., Prospect Park, Pa.; School of Dentistry, Temple University, 1925; died October 7; aged 55.

Weakley, Arthur D., Washington, D. C.; School of Dentistry, University of Pennsylvania, 1894; died June 21; aged 83.

Weinshenker, Lewis T., Chicago; Chicago College of Dental Surgery, Loyola University, 1906; died June 21; aged 68.

Werdegar, Maurice, New York; School of Dentistry, University of Buffalo, 1919; died September 6.

Werner, Louis H., Bronx, N. Y.; New York College of Dentistry, 1912; died September 10; aged 62.

West, Warren E., Wheatland, Wyo.; Kansas City-Western Dental College, 1924; died July 24; aged 53.

Westling, Olaf K., Riverton, Wyo.; Dental School, Northwestern University, 1914; died September 14; aged 73.

Whitley, Hugh H., Corpus Christi, Texas; State Dental College, Dallas, 1916; died June 14.

Wilkinson, Albert D., Troy, Mo.; School of Dentistry, Washington University, St. Louis, 1903; died September 21; aged 73.

Williams, Parris S., Mound Bayou, Miss.; Dental Department, Meharry Medical College, 1911; died September 7; aged 69.

Wilson, Jerome, Houston, Texas; died July 28; aged 44.

Wilson, Reid A., Brookville, Pa.; Philadelphia Dental College, 1897; died June 5.

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Prosthodontics, Complete: Daniel H. Gebl, 2510 W. Capitol Drive, Milwaukee

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Roentgenology: Duane W. Lovett, University of Iowa Dental School, Iowa City

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami, Fla.
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco
Ninety-Seventh Annual Session	Oct. 1-4, 1956	Atlantic City, N.J.

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 25-27	Biloxi, Miss.	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	Aug. 2-5	Anchorage	C. J. Pearson	500 K St., Anchorage
Arizona	Apr. 21-24	Phoenix	E. M. Scott	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 4-7	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 26-28	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	May 3-5	Los Angeles	J. P. Bowers	124 W. Lime Ave., Monrovia
Colorado	Oct. 3-6	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	June 2-4	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			J. C. Baker	Mayfair Apts., Sec. C., 1300 Harrison St., Wilmington
District of Columbia	June 8	Washington	Z. B. Lloyd	2007 R St., N.W., Washington
Florida	Apr. 25-28	Daytona Beach	B. S. Carroll	706 Professional Bldg., Jacksonville
Georgia	Oct. 10-13	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	June 23-26	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	Apr. 29, 30	Boise	C. G. Hanson	409 11th Ave., S., Nampa
Illinois	May 10-13	Springfield	P. W. Clopper	623 Jefferson Bldg., Peoria
Indiana	May 17-19	Indianapolis	E. E. Ewbank	Box 96, Kingman
Iowa	May 3-5	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 16-19	Wichita	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 5-7	Louisville	A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana	Apr. 21-24	Baton Rouge	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 24-26	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland	May 3-5	Baltimore	E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore
Massachusetts	May 2-5	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	Apr. 25-28	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 22-24	St. Paul	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi	June 5-8	Biloxi	B. A. Cohen	306 Plaza Bldg., Jackson
Missouri	June 13-16	St. Louis	E. D. Suggett	201 Merchants Bank Bldg., Jefferson City
Montana	May 6-8	Great Falls	E. G. Vedova	Roundup
Nebraska	May 10-12	Omaha	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	June 18-20	Reno	O. M. Seifert	506 Humboldt St., Reno
New Hampshire	June 13-15	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 4-6	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 23-26	Santa Fe	J. S. Eilar	Medical Arts Square, Albuquerque
New York	May 10-12	Buffalo	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 16-19	Pinehurst	R. D. Coffey	Kibler Bldg., Morganton
North Dakota	May 23-25	Bismarck	V. B. Keltgen	517 de Lendrecie Bldg., Fargo
Ohio	Oct. 17-20	Cincinnati	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20-23	Oklahoma City	D. Robertson	434 N.W. 13th St., Oklahoma City
Oregon	Mar. 1-3	Portland	W. H. Hurley	308 Selling Bldg., Portland
Panama Canal Zone			A. L. Teitel	U.S. Naval Station, Hoffman
Pennsylvania	Oct. 5-7	Pittsburgh	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			F. Ordoñez	1558 Ponce de León Ave., Stop 23, Santurce
Rhode Island			N. G. Migliaccio	1467 Westminster St., Providence

State	Date	Place	Secretary	Address
South Carolina	May 23-25	Columbia	J. R. Owings	7 Medical Court, Greenville
South Dakota	May 20-22	Sioux Falls	L. N. Thelen	310A W. 18th St., Sioux Falls
Tennessee	May 10-12	Chattanooga	W. L. McCulley	Brown Bldg., Cleveland
Texas	Apr. 25-29	Dallas	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 8-10	Salt Lake City	K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 16-18	Woodstock	W. J. Reardon	18 Madison St., Rutland
Virginia	Apr. 12-14	Richmond	W. T. McAfee	705 Colonial National Bank Bldg., Roanoke
Washington	Mar. 25-27	Seattle	W. B. Martin	Medical-Dental Bldg., Seattle
West Virginia	July 25-28	White Sulphur Springs	G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 20-22	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming	June 20-23	Rock Springs	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 21-24*†	Birmingham	W. L. McCarty	200 Professional Center, Montgomery
Alaska			P. H. Williams	Box 2122, Juneau
Arizona			R. K. Trueblood	107 East A Ave., Glendale
Arkansas	June 21-25*†	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California	Feb. 8	San Francisco	K. I. Nesbitt	507 Polk St., San Francisco
	June 21	Los Angeles		
	July 26	San Francisco		
Colorado	June 21-25	Denver	C. K. Phillips	724 Republic Bldg., Denver
Connecticut			C. G. Brooks	302 State St., New London
Delaware			F. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	1835 Eye St., N.W., Washington
Florida	July 12-22*†	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia			S. H. Yarbrough	12 Medical Arts Bldg., Columbus
Hawaii			H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			R. E. Blickenstaff	1023 Fourth St., S., Nampa
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana	June 15-18*†	Indianapolis	C. A. Frech	504 Broadway, Gary
Iowa	May 24-28*†	Iowa City	D. J. FitzGerald	615 Brick & Tile Bldg., Mason City
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky	June 7-10	Louisville	R. M. Justice	1330 Central Ave., Ashland
Louisiana			R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	June 7-9		H. Levin	3429 Park Heights Ave., Baltimore
Massachusetts	June 21-25*		R. A. Barrette	Rm. 33, State House, Boston
	June 23-25†			
Michigan	June 6-12	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit
Minnesota	June 14-18	Minneapolis	M. G. Walls	1470 Lowry Medical Arts Bldg., St. Paul
Mississippi	June 15-17	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri			R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana	July 12-16	Helena	V. J. Quinn	301 Phoenix Bldg., Butte
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			R. Whitehead	Suite 6, Masonic Temple, Reno
New Hampshire	June 18-19	Boston	S. G. Markos	8 Renaud Ave., Dover
New Jersey	June 2-4*‡	Trenton	W. A. Wilson	150 E. State St., Trenton
	June 7-8*‡	Philadelphia		
	June 14, 15*‡	New York		
New Mexico	June 26-29	Santa Fe	J. J. Clarke, Sr.	Artesia
New York	Feb. 11†‡		D. W. Beier	23 S. Pearl St., Albany
	Feb. 11, 12*‡			
	Feb. 16, 17†‡			
	Feb. 16-19*‡			
North Carolina	June 28-July 2	Chapel Hill	F. O. Alford	1109 Liberty Life Bldg., Charlotte
North Dakota	July 12-16	Fargo	A. L. Pushor	Lisbon
Ohio			H. B. Smith	336 E. State St., Columbus
Oklahoma			R. P. Keidel	403 Surety Bldg., Muskogee
Oregon	June 14-17	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem

State	Date	Place	Secretary	Address
Pennsylvania	June 22-27*†‡	Philadelphia	A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Box 3717, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			H. T. Aker	Canton
Tennessee			F. S. Maxey	804 Bennie Dillon Bldg., Nashville
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			N. E. Munk	201 Cache Valley Bank Bldg., Logan
Vermont			F. A. Reid	Windsor
Virginia	June 14-18* June 14-16†	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond
Washington			M. L. Mower	National Bank of Commerce Bldg., Olympia
West Virginia	June 21-23*†	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	June 14-18*†	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. §Approximate dates—verify with state dental examining board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	Apr. 11	Miami Beach, Fla.	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
Algerian Federation of Dental Societies	Apr. 12-18	Oran, Algeria	J. Nahon-Fauchier	Maison Du Medecin, 6, Rue Général Joubert, Oran, Algeria
American Academy of Dental Medicine	May 14-16	Philadelphia	W. M. Greenhut Secy.	124 E. 84th St., New York
American Academy of Implant Dentures	Feb. 7	Chicago	P. S. Loechler Secy.	1924 Thomas Lane, Augusta, Ga.
American Academy of Oral Pathology	Feb. 7	Chicago	J. L. Bernier Secy.	Armed Forces Institute of Pathology, 7th St. and Independence Ave., S.W. Washington, D.C.
American Academy of Restorative Dentistry	Feb. 6, 7	Chicago	A. G. James Secy.	409 N. Camden Drive, Beverly Hills, Calif.
American Association of Dental Schools	Mar. 22-24	French Lick, Ind.	M. W. McCrea Secy.	Baltimore College of Dental Surgery, University of Maryland, Baltimore
American Association of Endodontists	Feb. 6, 7	Chicago	V. B. Milas Secy.	2529 W. 63rd St., Chicago
American Association of Orthodontists	May 16-20	Chicago	F. A. Squires Secy.	Medical Centre, White Plains, N. Y.
American Board of Oral Surgery	May 8-10	Chicago	L. M. FitzGerald Secy.	718 Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	May 11-15	Chicago	C. E. Martinek Secy.	661 Fisher Bldg., Detroit
American Board of Prosthodontics	Feb. 1-7	Kansas City, Mo.	S. H. Payne Secy.	University of Buffalo, School of Dentistry, Buffalo
American Dental Society of Europe	July 6-9	Paris, France	J. P. Molony Hon. Secy.	110 Harley St., London W.1, England
American Denture Society	Feb. 6, 7	Chicago	A. L. Roberts Secy.	Aurora National Bank Bldg., Aurora, Ill.
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 22	New York	M. H. Feldman Exec. Secy.	730 Fifth Ave., New York
American Society of Oral Surgeons	Nov. 3-6	Hollywood, Fla.	R. F. Whalen Exec. Secy.	1112 E. Clay St., Richmond, Va.
British Dental Association	May 10-14	Blackpool, England	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London W.1, England
Chicago Dental Society	Feb. 7-10	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Cincinnati March Clinic Meeting	Mar. 21-23	Cincinnati	P. McMullen Exec. Secy.	123 E. Sixth St., Cincinnati
Council on Dental Education, Dental Aptitude Tests	Mar. 5, 6		S. Peterson Secy.	222 E. Superior St., Chicago
District of Columbia Dental Society Postgraduate Clinic	Mar. 14-17	Washington	Z. B. Lloyd Secy.	2007 R St., N.W., Washington

Name	Date	Place	Secy. or Chm.	Address
Federation Dentaire Internationale	June 6	The Hague, Netherlands	G. H. Leatherman Secy. Gen.	35, Devonshire Place, London W.1, England
Greater Philadelphia Annual Meeting	Feb. 3-5	Philadelphia	R. Adams Secy.	337 Bellevue-Stratford Hotel, Broad and Walnut Sts., Philadelphia
International Association for Dental Research	Mar. 19-21	French Lick, Ind.	E. H. Hatton Secy.	311 E. Chicago Ave., Chicago
National Board of Dental Examiners	Mar. 29, 30		G. J. Casey Secy.	222 E. Superior St., Chicago
Ninth Pacific Coast Dental Conference	June 1-5	Banff, Alberta, Can.	H. B. Powell Secy.	Greyhound Bldg., Calgary, Alberta, Can.
Northeastern Society of Orthodontists	Mar. 8, 9	New York	O. Jacobson Secy.	35 W. 81st St., New York
Pacific Coast Society of Prosthodontists	May 29, 30	Seattle	A. W. Spaulding Secy.	4350 Eleventh Ave., Los Angeles
Southeastern Academy of Prosthodontics	Mar. 20, 21	Atlanta, Ga.	R. W. Durham Secy.	1001 Bankers Insurance Bldg., Macon, Ga.
Southern Academy of Oral Surgery	Mar. 12-14	Savannah, Ga.	R. F. Sullivan Secy.	118 Jones St., E., Savannah, Ga.
Southern Academy of Periodontology	Mar. 28-30	New Orleans	E. L. Banks Secy.	Candler Bldg., Atlanta, Ga.
Thomas P. Hinman Mid-Winter Clinic	Mar. 21-24	Atlanta, Ga.	S. Holbrook Exec. Secy.	15 Peachtree Place, N.W. Atlanta, Ga.

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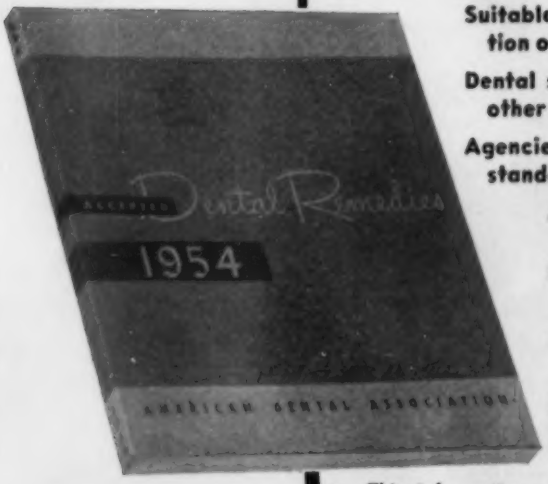

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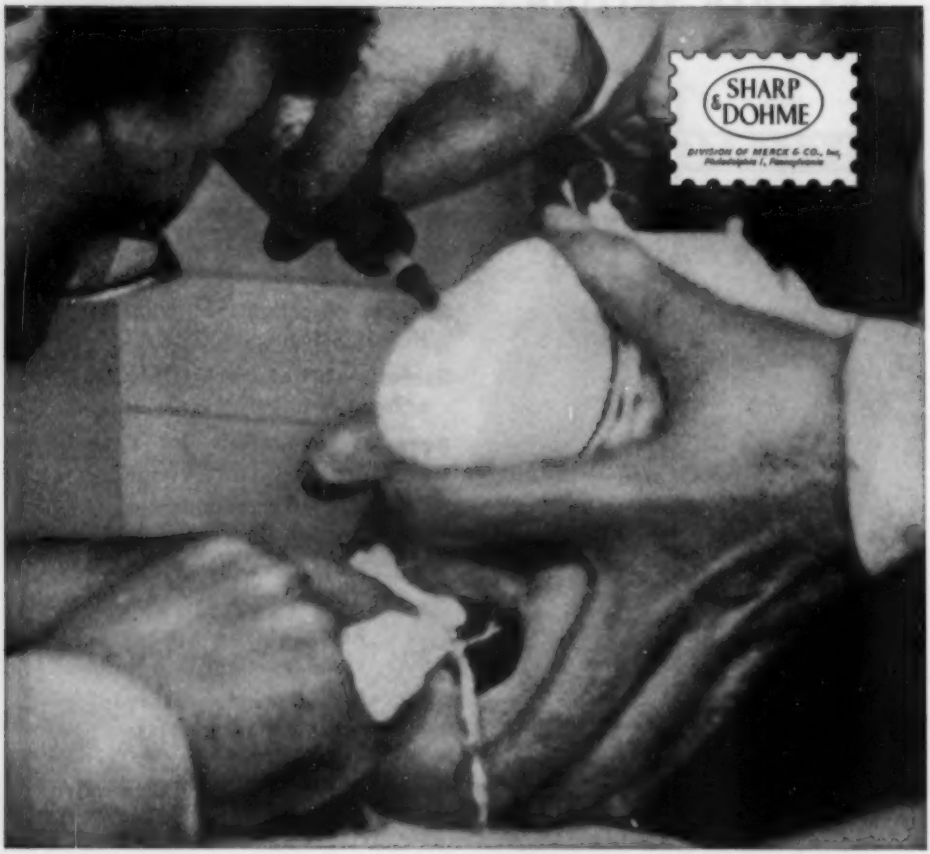

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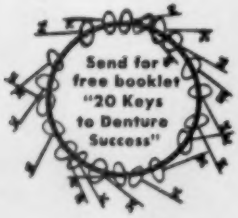

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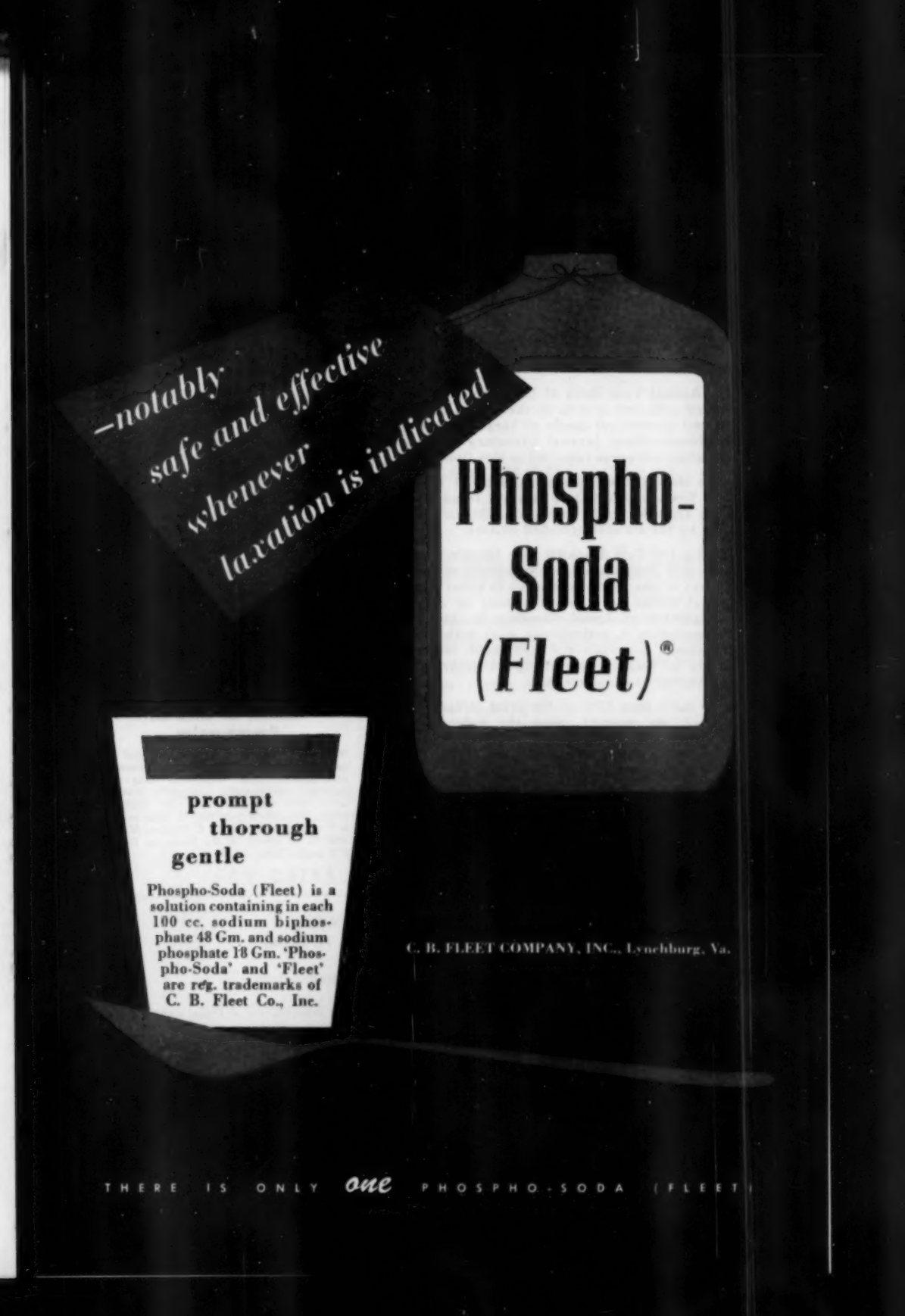
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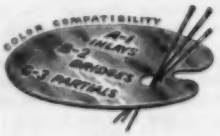

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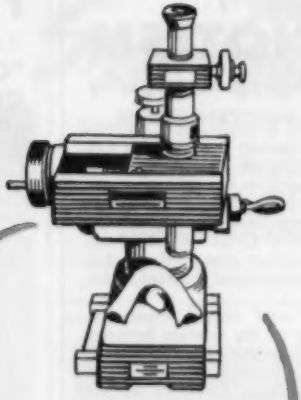

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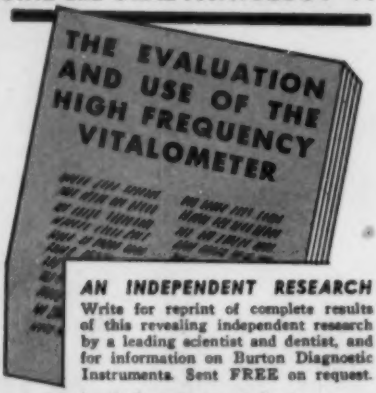

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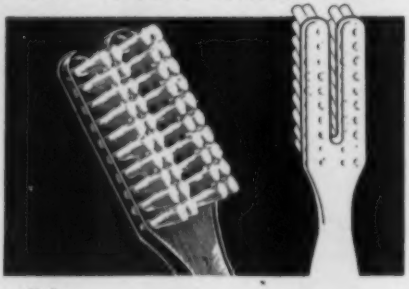

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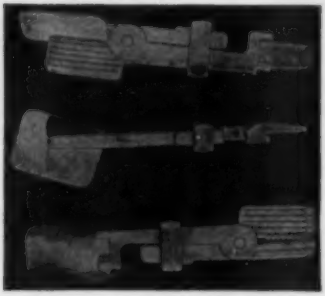

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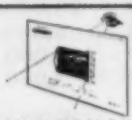

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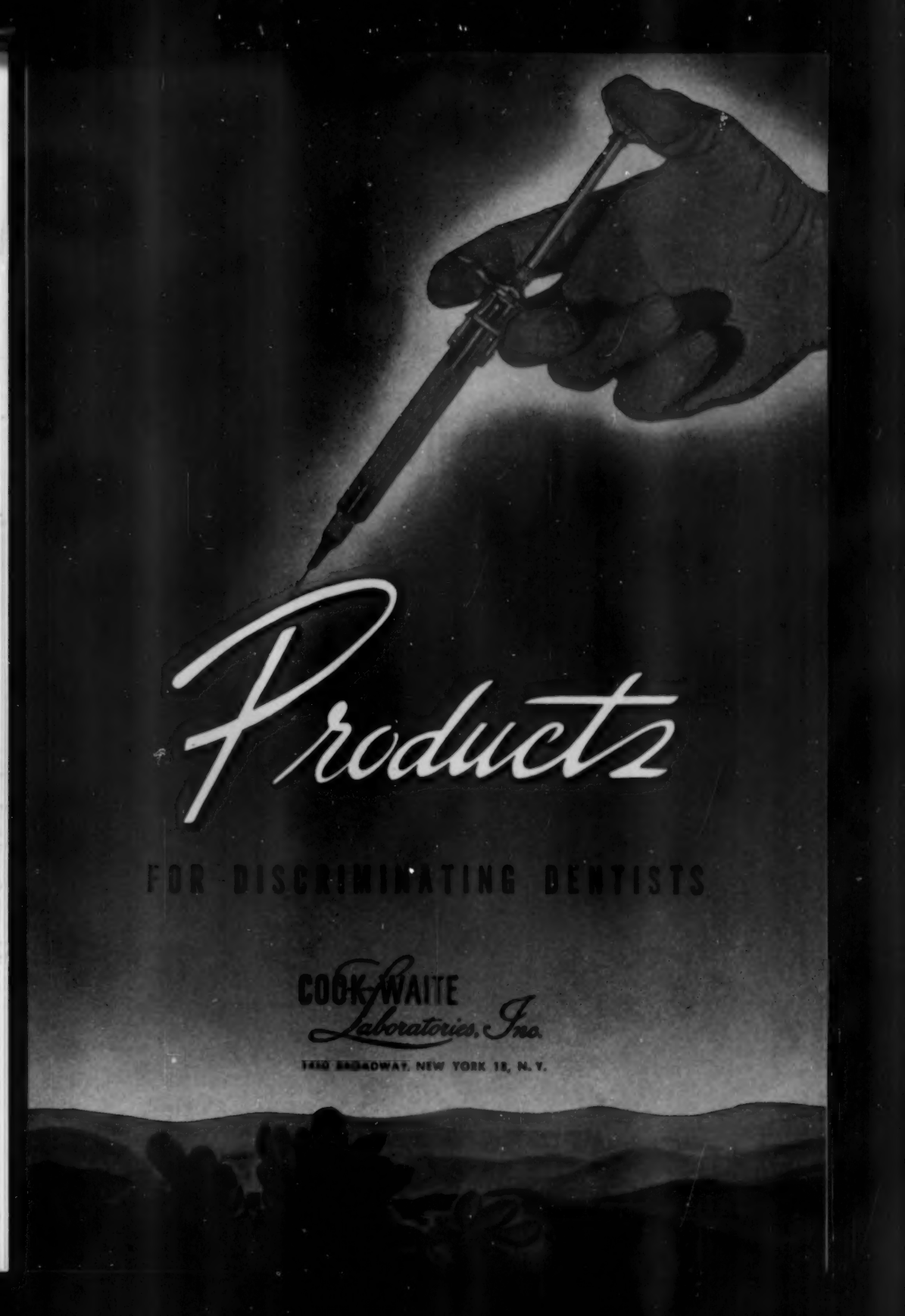
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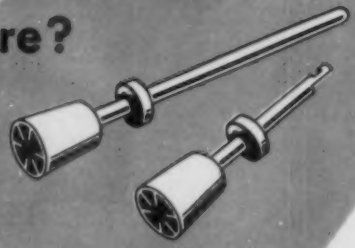

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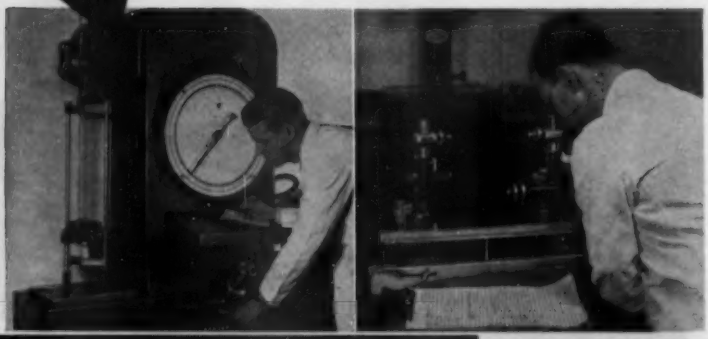

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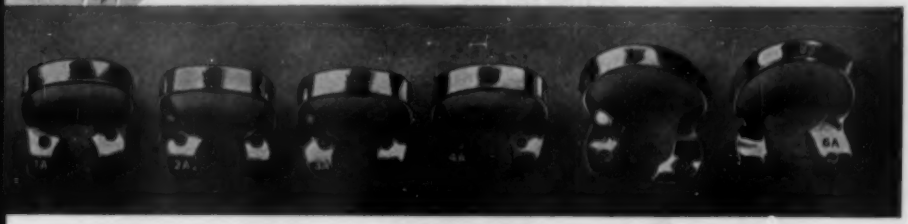

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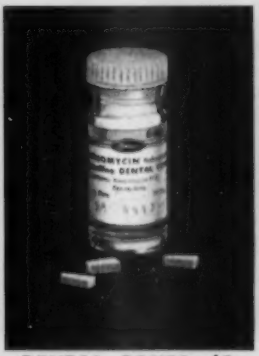

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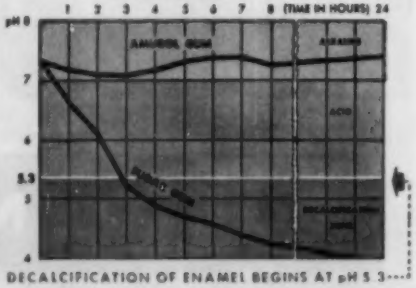

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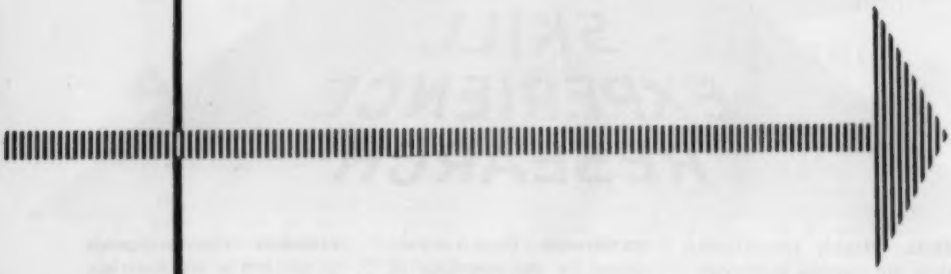

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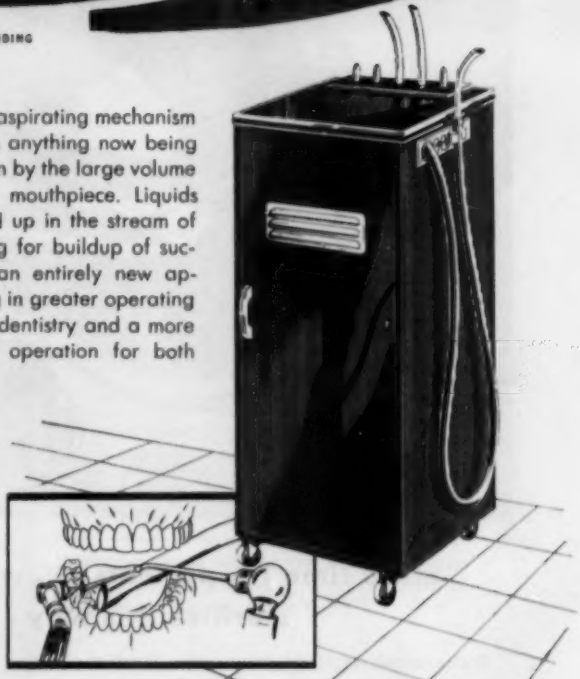

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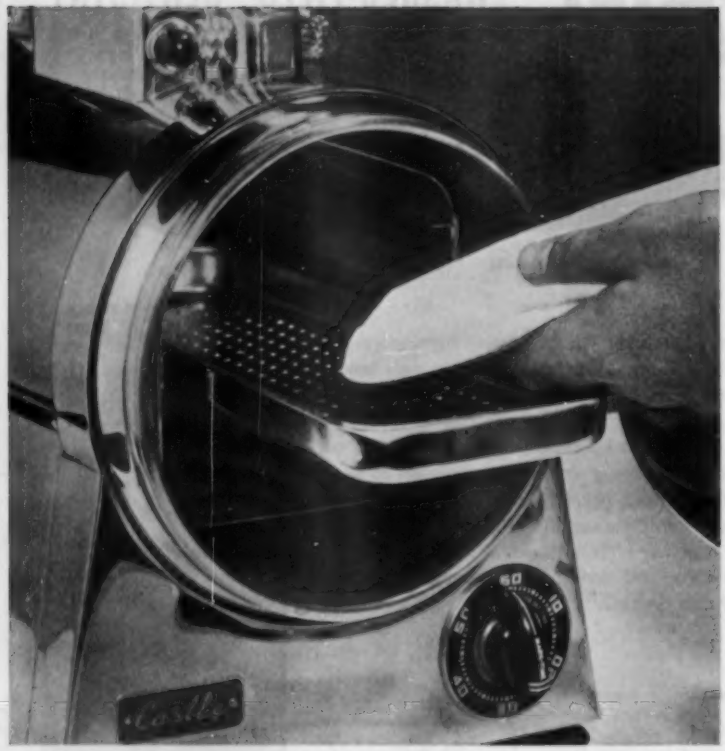

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Hingson, R.A., N.Y. J. Dent., 30:370 (Oct.) 1950.

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